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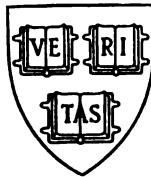
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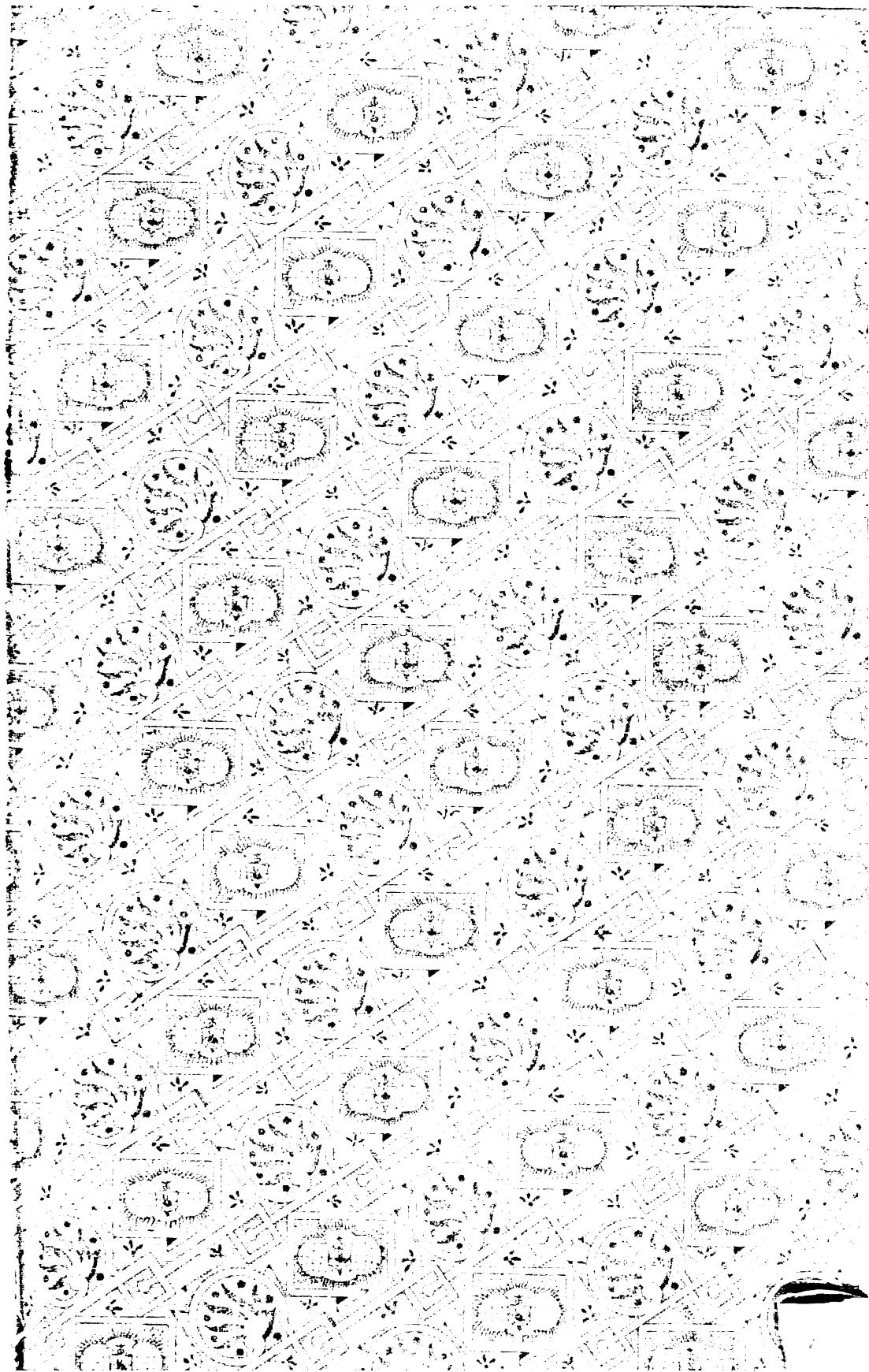
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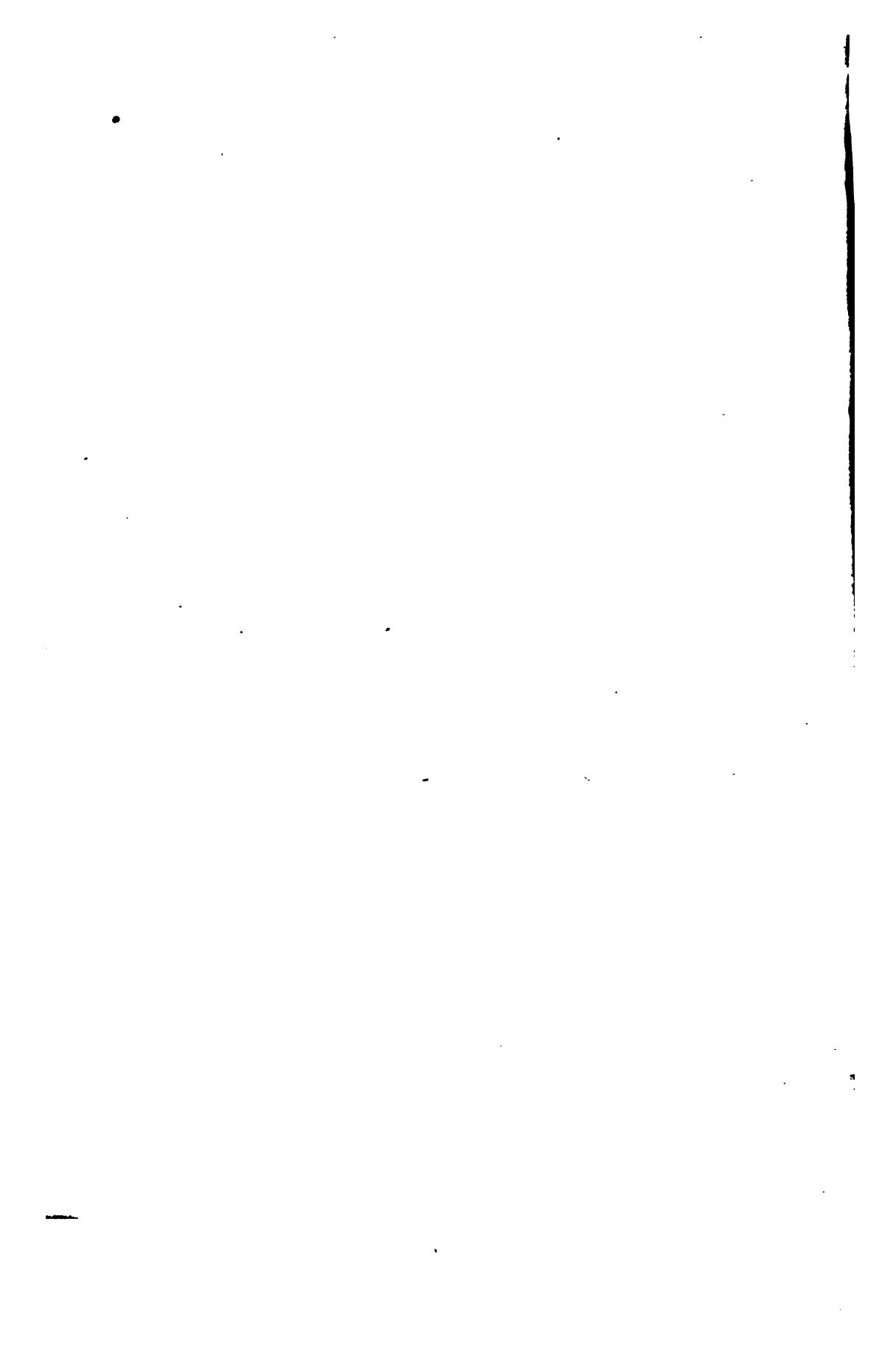
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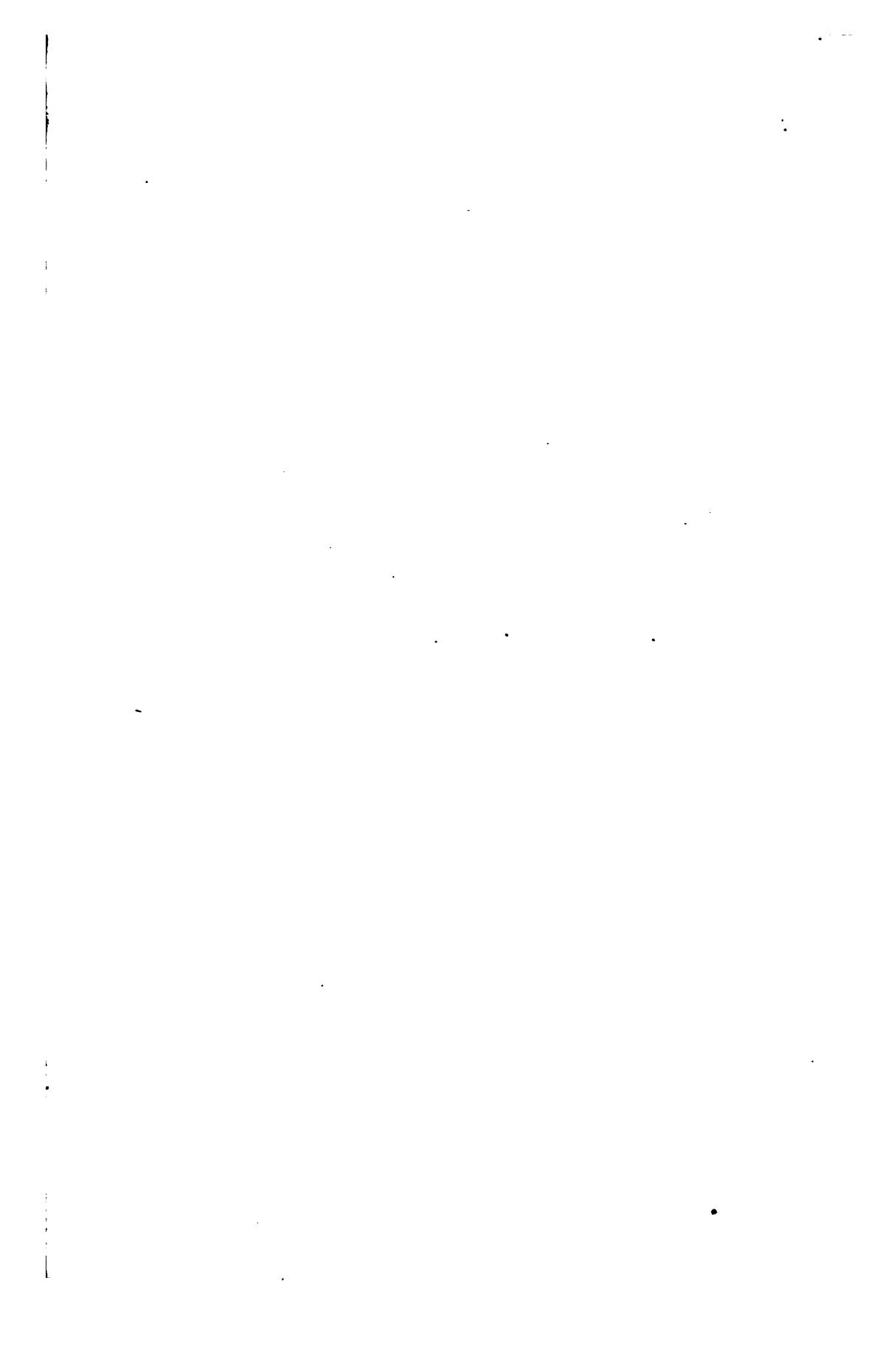
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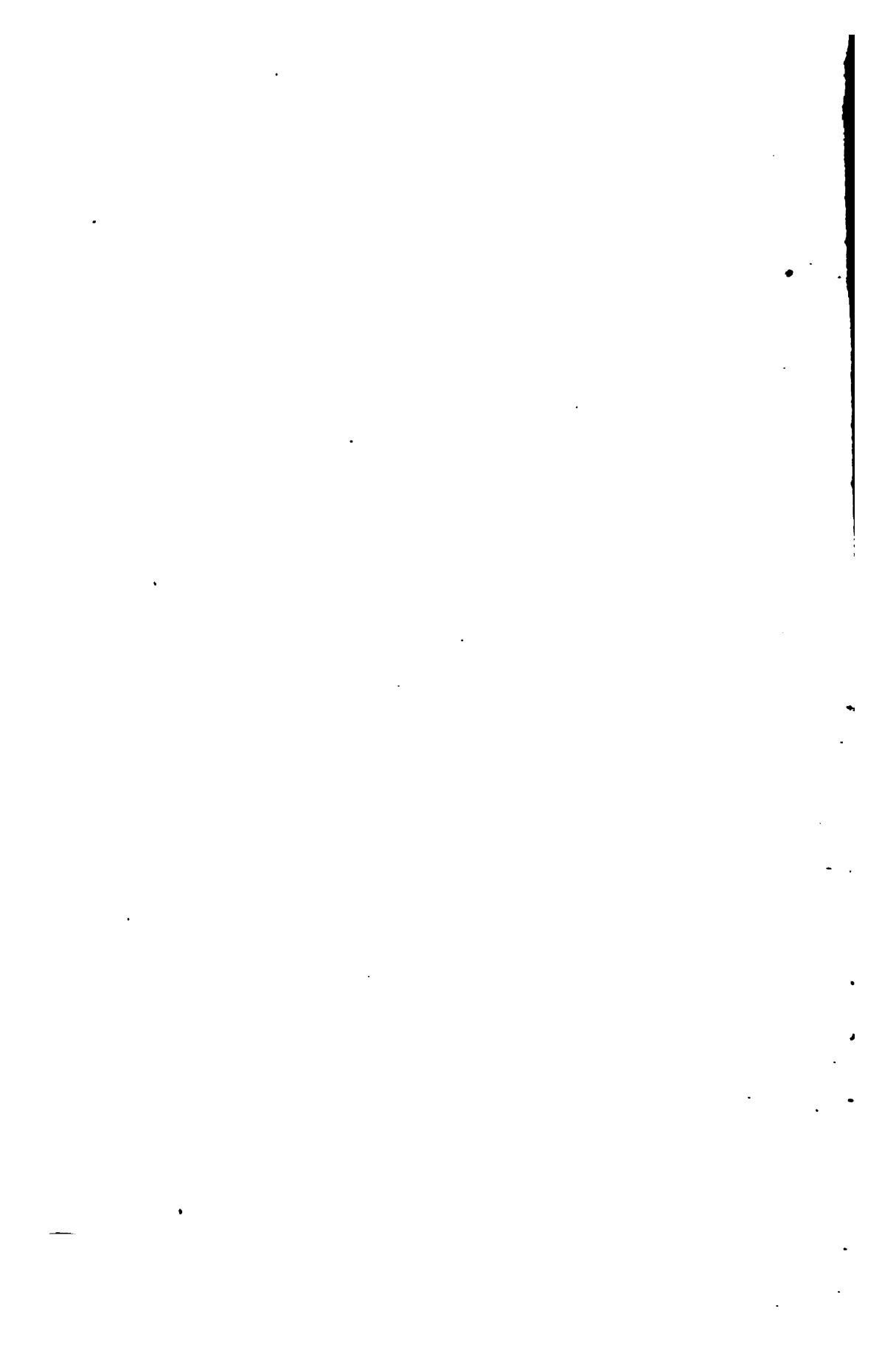


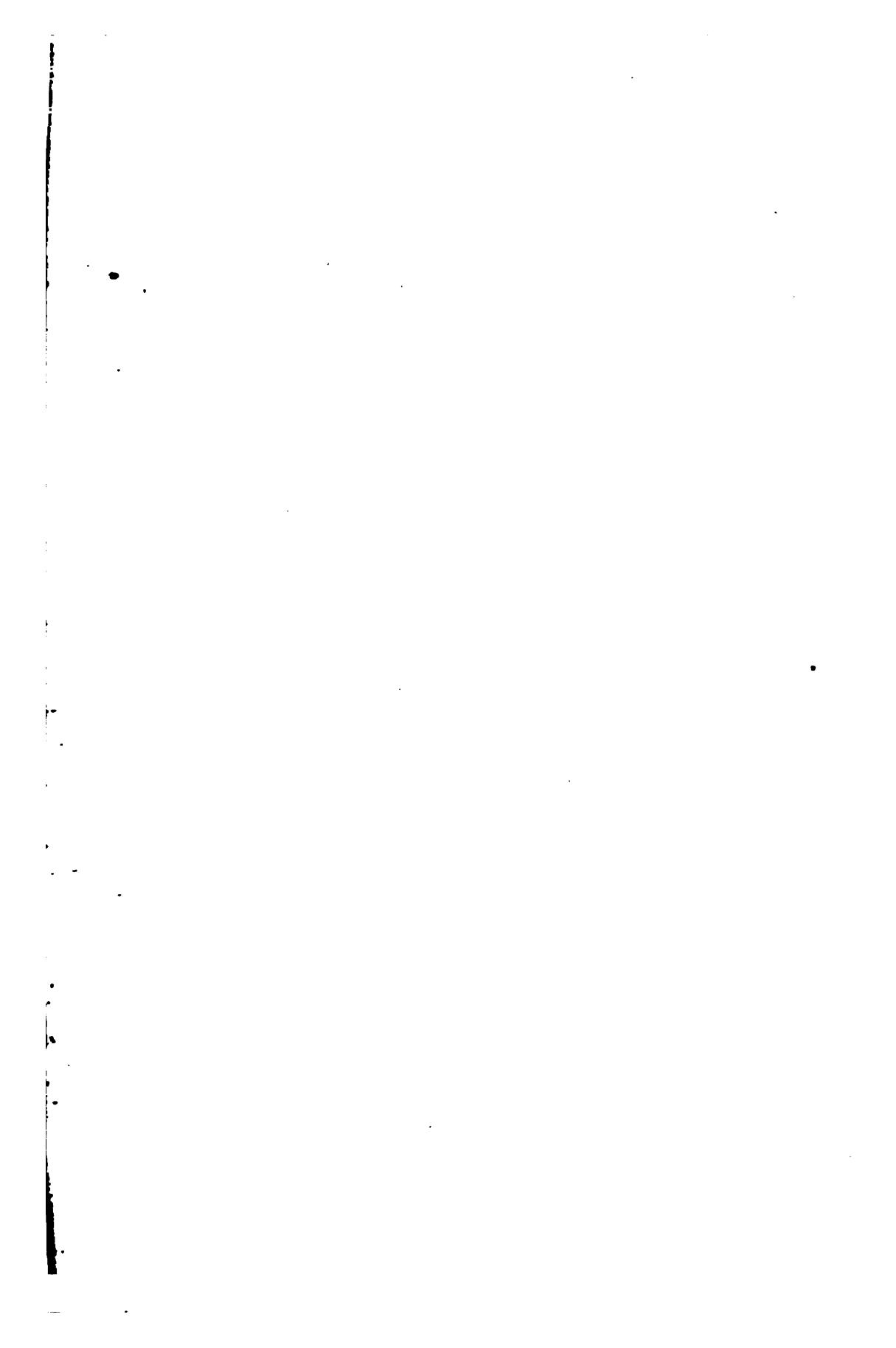
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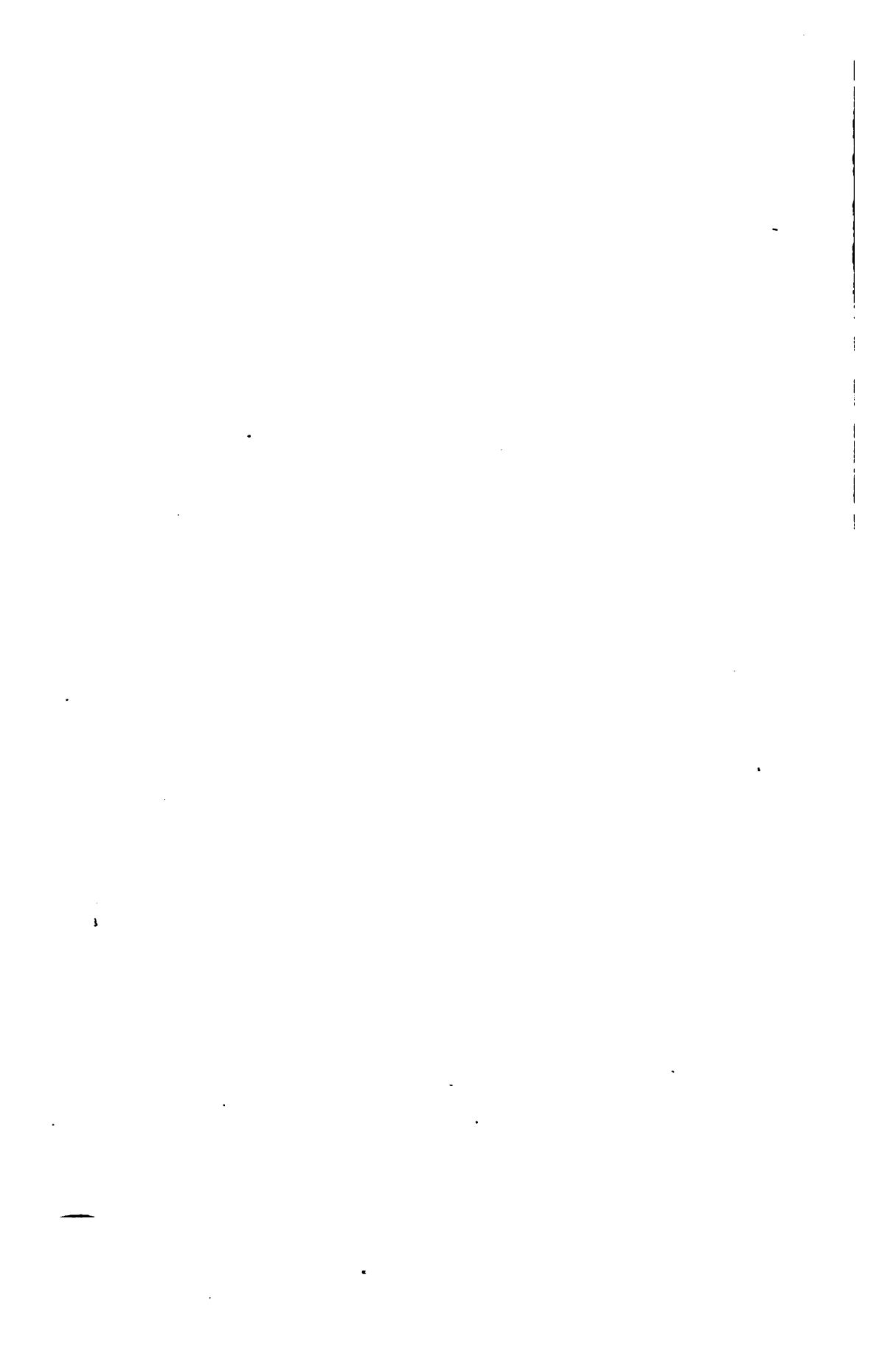












ANNUAL
OF THE
UNIVERSAL MEDICAL SCIENCES

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL
SANITARY SCIENCES THROUGHOUT THE WORLD.

EDITED BY
CHARLES E. SAJOUS, M.D.,
AND
SEVENTY ASSOCIATE EDITORS,

ASSISTED BY
OVER TWO HUNDRED CORRESPONDING EDITORS, COLLABORATORS,
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DISEASES OF THE BRAIN.

BY LANDON CARTER GRAY, M.D.,

ASSISTED BY

W. B. PRITCHARD, M.D., AND R. C. SHULTZ, M.D.,

NEW YORK.

LOCALIZATION.

THE literature of the past year has not been marked by any strikingly original contributions to the domain of cerebral localization. The process of threshing continues. Many papers of an analytical character have appeared bearing upon the general subject, and containing critical *résumés*, of more or less value, of the work done in previous years. One of the most comprehensive and interesting of such papers was contributed by H. H. Donaldson²⁸⁸_{App.}; another is by O. S. Baines.¹⁹² Sanger Brown²⁸⁶_{Mer.} publishes cuts of the brain, which are reproduced here, illustrative of our present knowledge of the subject. (See pages 3 and 4.) It will be seen that he rejects Ferrier's view that the angular gyrus is concerned in vision as a cortical centre.

Beck²⁸⁶_{No. 16} has succeeded in establishing, to his own satisfaction at least, the existence of "cortical-action currents" produced by stimulation of a peripheral nerve. For example, stimulation of the eye of a dog by magnesium flash-light caused a demonstrable electro-negative variation of potential in the occipital lobe of the opposite side, the brain having been exposed of course. The dogs were curarized and the variations determined with a galvanometer, non-polarizable electrodes being used. Fleischl,²⁸⁵_{No. 15} in a later article, claims to have preceded Beck in the demonstration of these phenomena, though, as he acknowledges that he did not publish his observations, Beck's work stands as entirely original.

Centres of Common Sensation.—The results of several autopsies, considered in their relations to the symptoms noted during life, and which bear upon this subject, all tend toward the establishment of an hypothesis, placing the sensations of tact, touch, and

muscular perception, and perhaps pain and temperature sense in constant relation to the cortical or subcortical white substance of the mid-parietal convolutions.

Explanation of Shading on Cuts.—The motor areas are all related to movements on the opposite side of body, and the same is true for the area for general sensibility, marked "senory." The occipital lobe supplies functional sensibility to half of each retina on the same side. The hypothetical areas of vision (angular gyrus) and hearing are described as being crossed.

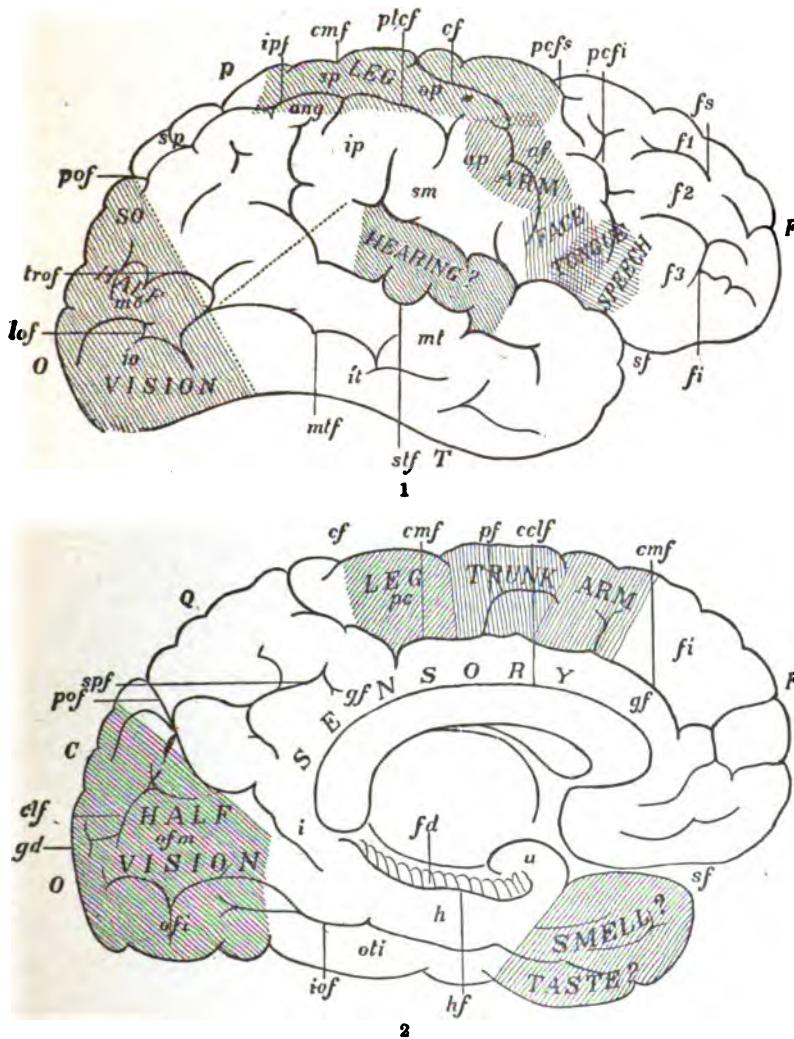
Fig. 1. *Fissures.*—*c. f.* Central, or fissure of Rolando. *s. f.* Fissure of Sylvius. *p. c. f. s.* Superior, and *p. c. f. i.* inferior praecentral. *f. s.* Superior, and *f. i.* inferior frontal. *p. t. c. f.* Post-central, practically the anterior part of *i. p. f.* the intra-parietal. *c. m. f.* marks about the position of the upper end of the calloso-marginal. *p. o. f.* Parieto-occipital. *t. r. o. f.* Transverse occipital. *l. o. f.* Lateral occipital. *s. t. f.* Superior temporal, or parallel. *m. t. f.* Middle temporal. *Lobes.*—*F.* Frontal. *P.* Parietal. *O.* Occipital. *T.* Temporal or temporo-sphenoidal. *Convolutions.*—*a. f.* Ascending frontal, or praecentral. *f1.* Superior, *f2.* middle, and *f3.* inferior frontal. *a. p.* Ascending parietal, or post-central. *s. p.* Superior parietal (lobule) continuous on the mesial surface with the praecuneus (*Q.* outline of Fig. 2). *i. p.* Inferior parietal (lobule) continuous in front with *s. m.* the supra-marginal, and behind with *ang.*, the angular (pli éourbe). *s. o.* Superior, *m. o.* middle, and *i. o.* inferior occipital. *s. t.* Superior, *m. t.* middle, and *i. t.* inferior temporal convolution.

Fig. 2. *Fissures.*—*s. f.* Sylvian. *c. c. l. f.* Fissure of corpus callosum. *c. m. f.* Calloso-marginal. *c. f.* Central, or fissure of Rolando, its upper end. *p. f.* Paracentral. *s. p. f.* Subparietal. *p. o. f.* Parieto-occipital. *c. l. f.* Calcarine. *i. o. f.* Inferior occipito-temporal, or collateral. *h. f.* Hippocampal, or dentate. *Lobes.*—*F.* Mesial aspect of frontal. *Q.* Quadrate, or praecuneus. *C.* Cuneus. *O.* Occipital. *T.* Temporal. *Convolutions.*—*f. i.* Superior frontal. *p. c.* Para-central lobule. *g. f.* Convolution of corpus callosum, or gyrus forniciatus. That part of it lying on the upper aspect of the corpus callosum is sometimes called the gyrus cinguli. It extends from below the genu in front to below the splenium behind, where it becomes rather suddenly narrowed to form *i.* the isthmus, and then continues on as *h.* the hippocampal convolution (subiculum cornu Ammonis, or uncinate convolution). *u.* Uncus. *g. d.* Gyrus descendens. *o. t. m.* Middle, and *o. t. i.* inferior occipito-temporal. *f. d.* Dentate, or fascia dentata.

Fig. 3. 1. Medulla oblongata. 2. Pons Varolii. 3. Cerebellum. 4. Flocculus. 5. Frontal lobe. 7. Occipital. 8. 9. Fissure of Sylvius.

Fig. 4. View of internal or mesial aspect of the cortex, the corpus callosum and hind-brain being cut down the middle line. 1. Medulla oblongata. 2. Pons Varolii. 3. Crus cerebri cut obliquely. 4. Cerebellum. 5. Aqueduct of Sylvius. 6. Valve of Vieuussens. 7. Corpora quadrigemina. 8. Pineal gland. 9. Its posterior peduncle. 10. Its so-called anterior peduncle, with the swelling of the ganglion habenulæ close to the gland. 11. Great transverse cerebral fissure. 12. Upper, and 13. Lower and internal surface of optic thalamus. 14. Soft or middle commissure. 15. Infundibulum. 16. Pituitary body. 17. Tuber cinereum. 18. Corpus mamillaire. 19. Posterior perforated space. 20. Third nerve. 21. Optic nerve. 22. Anterior commissure. 23. Foramen of Monro. 24. Fornix. 25. Septum lucidum. 26. Corpus callosum. 27. Splenium. 28. Genu and rostrum. 29. Fissure of corpus callosum, also called the ventricle of the corpus callosum. 30. Convolution of corpus callosum, gyrus forniciatus, or cinguli. 31. Internal surface of superior frontal convolution. 32. Calloso-marginal fissure. 33. Inferior occipito-temporal convolution. 34. Parieto-occipital fissure.

Darkschewitsch³¹⁰ reports the case of an isolated lesion producing right brachial monoplegia, with defect of all peripheral sensations, especially of tactile sensibility, more marked in the distal end of the limb. The lesion—a small cavity left by a



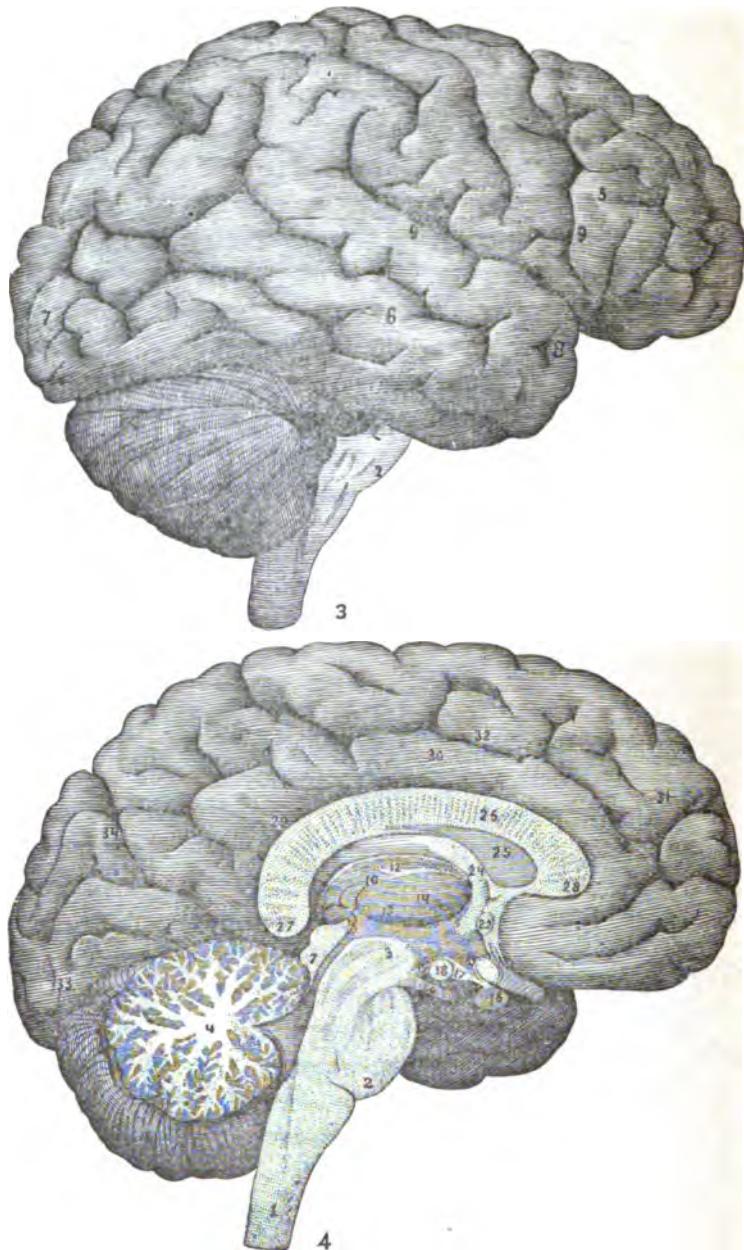
FIGS. 1 AND 2.—CEREBRAL LOCALIZATION.
(Review of Insanity and Nervous Disease.)

broken-down tubercle—was found in the left semiovale, just beneath the cortex of the middle portion of the posterior central convolution. A small tubercular mass, the size of a pea, situated a little higher than the cavity, was the only other pathological

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GRAY.

[Localization.



FIGS. 3 AND 4.—CEREBRAL LOCALIZATION.
(Review of Insanity and Nervous Disease.)

condition noted after careful examination, which included the basal-ganglia and the pons-medulla region and cord. The peripheral nerves were examined, and found to present nothing abnormal.

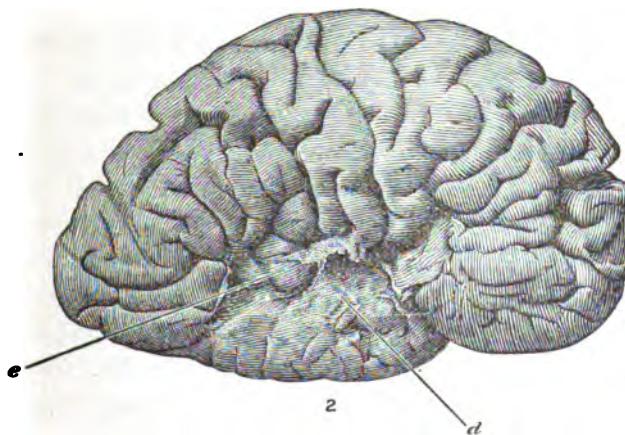
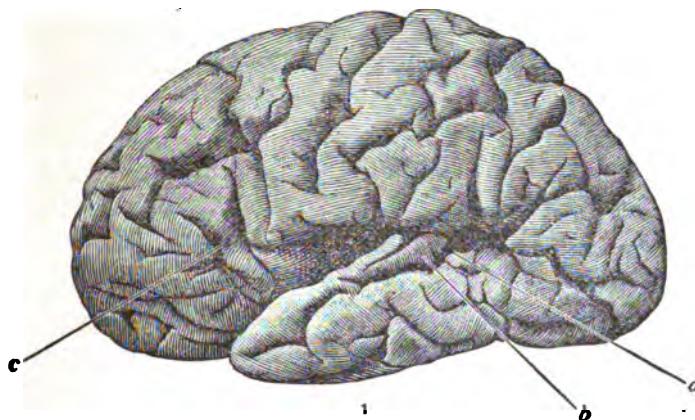
Knapp, of Boston,⁹⁹ relates the history of a man, the victim of epilepsy, mental weakness, and slightly impaired motor power, the result of trauma, with secondary degenerative changes, but with perfectly normal sensibility, who was operated upon at the site of the injury, a piece of diseased cortex being removed, the patient showing, after operation, loss of tactile and muscular sense, which persisted for some months. Pain and temperature sense were intact. The piece of cortex was excised from the middle parietal convolution posterior to the fissure of Rolando. The author's assumption that the clinical phenomena in this case support the theory of Munk, that the centres for common sensibility are cortical, is open to criticism in that no autopsy has been held, and therefore no exact information has been obtained as to the extent to which the subcortical tissues were injured directly, or indirectly, by the operation, or of the subsequent intensification of the original disease process consequent upon the operation. I reported a case of tumor of the right hemisphere, subcortical, and lying beneath the upper and the middle third portions of one posterior parietal convolution, with symptoms during life of gradually increasing paresis of the opposite extremities,—first the leg, then the arm,—and with marked loss of the muscular sense.

Edinger¹⁰⁰ relates the history of a case having some bearing upon this subject, though not possessing localizing value. The patient, a woman 48 years old, had an apoplectic seizure, with transient loss of consciousness, followed by right hemiplegia, hyperesthesia, and intense pains in the right side of the body. Eight months later slight athetosis and contracture were added, and, a little later, temporal hemianopsia of the right eye was observed. Two years after the onset of paralysis the patient, driven to desperation by the constancy and intensity of the pains, committed suicide. At the autopsy a small focus of embolic softening was found in the dorsal portion of the external nucleus of the left optic thalamus, extending backward into the pulvinar, and slightly involving the internal capsule at the posterior region of Charcot's sensory crossway. The affected fibres Edinger considered as apparently coming from the *temporal* and *occipital radiations*. Hemianesthesia, he remarks, is usually associated with lesions in this locality; hyperesthesia and hyperalgesia have been quite rarely noted.

The Visual Centre.—The only clinical testimony having any special value upon this field is a case reported by Eskridge.¹¹¹ The patient, a negro man, was shot in the left occipital region, living five days. At the autopsy the left cuneus was found to have been as completely destroyed as though removed by excision experiment. During life careful tests showed no motor paralysis or paresis, no defect of tactile, muscular, pain or temperature sense, and no special sense defect except total blindness of the right side of each eye to the median line (right homonymous hemianopsia). The case is strongly confirmatory of the observations of Seguin, Nothnagel, and others, locating the centre for half-vision in the cuneus.

Auditory Centre.—C. K. Mills¹¹² makes an exceedingly valuable clinical contribution to cerebral localization, in the report of a case of word-deafness following an apoplectic stroke, a second apoplectic attack so intensifying the original defect as to render the patient almost completely deaf, the lesions being found at the autopsy to have involved the first and second temporal convolutions of both hemispheres. The following are his conclusions: 1. The centre for word-hearing is situated in the hinder thirds of the first and second temporal convolutions; its exact position is in a line with or just in front of the posterior extremity of the horizontal branch of the fissure of Sylvius. Possibly it is restricted to the second temporal convolution. 2. The third, fourth, and fifth temporal convolutions take no part in cerebral audition. 3. A lesion confined to the posterior thirds of the first and second temporal convolutions of the left hemisphere will produce complete or almost complete word-deafness, the corresponding regions of the other hemisphere remaining intact. 4. The field or sphere for all auditory memories covers a much larger cortical area than that of word-hearing, including at least the posterior two-thirds of the first and second temporal convolutions. 5. The auditory field and special auditory centres have their highest development in the left hemisphere, but destruction of the auditory areas of the two upper temporal convolutions of both hemispheres is necessary to complete brain-deafness. 6. A lesion limited to the centre for word-hearing, and causing word-deafness, will cause also paraphasia in attempts at speaking and paraplexia in attempts at reading. 7. An isolated lesion of the centre for word-hearing, producing

absolute or nearly absolute word-deafness, does not necessarily cause inability to recall words by other means,—as, for instance, through their visual signs; in such cases probably the meaning of the word is understood, although the name cannot be properly verified in consciousness. 8. A cerebral lesion or lesions causing



LESIONS OF THE SUPERIOR TEMPORAL CONVOLUTI0NS.

FIG. 1.—Left Hemisphere. *a*, cyst or cavity, the result of an old embolism; *b*, atrophied first temporal, continuous with retro-insular convolution; *c*, ascending Sylvian fissure. FIG. 2.—Right Hemisphere. *d*, hemorrhagic cyst, destroying two upper temporal convolutions and other parts of inferior parietal convolution. *e*, depressed lower extremity.

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word-deafness will, in time, lead to secondary atrophy of the speech and oro-lingual centres on the motor or emissive side of the brain, and also to atrophy of the association tracts between the sensory and motor-bearing speech centres. 9. The retro-insular convolutions are anatomically and functionally closely related with

subdivisions of the first temporal convolution, the most posterior of these retro-insular convolutions being continuous with the posterior half or two-thirds of the first temporal convolution.

The Thermotaxic and Polypnoëic Centres.—Isaac Ott²⁴² locates these centres in the tuber cinereum, in confirmation of his former observations and experiments. He found that puncture of the anterior extremity of the optic thalamus only caused a rise of temperature by coincident injury to the tuber cinereum. The centre for vaso-dilatation he places at the same locality.

Bartholomeo Baculo,²⁴² of the University of Naples, promulgates the following conclusions: (1) injury to the posterior or middle one-third of the optic thalamus produces general elevation of temperature, more especially of the side of the body corresponding to the lesion, and particularly of the upper parts; (2) injury to the nates, corpora quadrigemina, or peduncles caused a general elevation of temperature, especially in the half of the body corresponding to the lesion, and particularly of the inferior parts; (3) injections into the ventricles (lateral) produced a general lowering of temperature; (4) puncture of the cortical centres, practiced without trephining and without injury to basal ganglia, caused lowering of the general temperature for several days.

W. Hale White¹⁷⁸ formulates his conclusions as follows: (1) neither an anæsthetic nor operation on the brain of an animal affects the temperature much, unless some special part of the brain is damaged; (2) lesions of the corpus striatum, if not large enough to give rise to shock and severe haemorrhage, cause a considerable rise of temperature; (3) lesions of the septum lucidum also cause a rise of temperature; (4) lesions of the optic thalamus do not cause a rise of temperature; (5) lesions of the white matter around the corpus striatum and optic thalamus do not cause a rise of temperature; (6) lesions of the cerebellum do not alter the temperature; (7) lesions of the anterior part of the upper surface of the cerebral cortex do not alter the temperature except, possibly, very slightly; (8) lesions of the posterior upper surface of the cerebral cortex may cause irregular rises or alterations of temperature; (9) lesions of the crura cerebri cause a considerable rise of temperature. With such diametrically opposed results we feel justified in at least declaring the question still *sub judice*.

Functions of the Cerebellum.—Courmont^{200¹; 82} upholds, very

ingeniously and with much logical acumen, the doctrine that this organ presides over sensory functions. He appeals to the facts of anatomy, physiology, disease, vivisection experiments, and the origin of "sentimental" cranial nerves in this region as supporting his belief. The cerebrum presides over motor and mental functions, the cerebellum over sensory. Both are histologically and anatomically similar in the presence of white- with superimposed gray-matter cells and commissural fibres. In the female the cerebellum is relatively larger than in males, corresponding to differences in psychical sensibility and intellectual functions. The anterior (motor) nerve-tracts of the cord incline toward the cerebrum, the posterior toward the cerebellum. Animals deprived of all the substance of the hemispheres can still feel pain and express emotion. Many instances of isolated disease of the cerebellum, with associated sensory symptoms and preserved intellectuality, are cited. Comparative anatomy in the lower animals points toward the same conclusions. The sentimental nerves—lachrymal, acoustic, and facial—have partial origin in the cerebellum. His final proposition is, that the posterior encephalon acts by its reflex mechanism upon the anterior brain, just as the posterior cord acts upon the anterior, and this theory he cites as affording a better understanding of motor inco-ordination produced by cerebellar affections.

Kölliker² contributes an elaborate paper, embodying the results of extended researches upon the structural anatomy, histology, and physiology of the cerebellum, carried out by means of Golgi's quick-hardening method, which he represents as possessing remarkable advantages in many respects. Doursout³⁸¹ May, June concludes that the functions of the cerebellum have not as yet been defined beyond the fact that it is capable of originating and controlling certain movements. The paper is utterly without scientific value, however, so far as the author's deductions are concerned.

Cranio-Cerebral Topography.—Clevenger⁷⁷⁰ July publishes a description of a new and simple cyrtometer, consisting of an elastic rubber strap, which is to be stretched over the skull when used, and therefore is shorter than the head-length. On such a band, ten inches in length, marks can be made at three and five and a half inches, to indicate respectively the lowest point of the sulcus, when the strap is stretched between glabella and inion, around the side of the head; and the summit of the sulcus, when stretched

over the head between the same points. The length of the strap can be adjusted according to the size of the head. A rubber cap, also smaller than the head, may have all the cerebral fissures and centres depicted upon it, and, when stretched over the skull, the brain-parts are represented over their approximate sites. The author recapitulates the conditions which are to be taken into consideration as altering the relationship of cranial and cerebral parts, which are well known for the most part, but may be reproduced here without risk of adverse comment, in view of their importance: (1) Idiocy may grossly displace any part of the brain, usually throwing the sulcus of Rolando forward; (2) in the congenitally mentally defective—as with idiots, imbeciles, hebephreniacs, paranoiacs, and other neurotic persons—the right sulcus may be farther backward than the left; (3) normally the left sulcus is farther back; (4) compressing tumors or atrophy may change the convolutional positions; (5) the sulcus is farthest back in the scale of intelligence; (6) the warmest portion of the upper back part of the scalp is usually over the Rolandic summit; (7) the “ tonsure,” or earliest bald spot in this region, is somewhat similarly placed.

APHASIA.

Physiology and Pathology.—Montagu Lubbock,²² in a series of post-graduate lectures upon “Anomalies of Speech in Children,” presents an exhaustive review of the subject, with numerous practical suggestions as to means by which functional defects of speech may be corrected. John Wyllie²³ makes two valuable contributions, entitled “The Functional Disorders of the Vocal Mechanism.” E. W. Holmes¹ gives an exceedingly lucid summary of our present knowledge of the subject, both as regards the various sub-types and the cerebral regions which are in relation to them. Pascal, of Bordeaux,²⁴ accepts the view of Picot, that changes in the Island of Reil determine aphasia only by interfering with association fibres uniting the motor with the sensory centres of speech. Pick²⁵ suggests a similarity in dyslexia to the intermittent limping observed in horses,—which veterinarians consider as dependent upon arterial spasm and ischaemia,—and thinks that dyslexia may be due to arterial sclerosis, the intermittent contraction of the blood-vessel compelling the patient to halt. After a rest, the man can go on again for a time.

Functional Aphasia.—Gibert²⁰⁸ describes a case of motor aphasia and word-blindness, with retained ability to understand spoken language, which had come on abruptly in a woman previously hysterical. Binschwanger saw the case, and confirmed the diagnosis of an hysterical origin, though admitting the impossibility of excluding embolism. The case subsequently improved greatly, and complete cure was expected at the time of the report. Stacy Wilson²¹⁴ exhibited a patient, aged 51 years, who suffered from a third attack of aphasia. The first attack occurred in 1885, and was associated with word-blindness, the patient remaining dumb for eleven months. He recovered quite suddenly, and remained well until January, 1890, when he again lost speech, regaining it through a fright three weeks later. He became speechless again in August, 1890, and still remained absolutely mute. Wilson considered the case one of hysterical mutism.

Chevalier⁴⁵⁴ reports a case of transitory aphasia with agraphia, lasting one day, and coming on as a result of violent anger. The patient, an army officer 30 years old, was temperate, but had contracted syphilis some years previously. During the aphasic period he complained of pain in the left side of the head and of coldness and weakness in the right side of the body. The author thought it probable that the symptoms were due to limited cerebral congestion consequent upon strong emotion.

A case of "retrograde" amnesia is related, in a man aged 21, who fell from his horse and lost consciousness, but regained it almost instantly, recalling the incident and method of his fall quite distinctly. Ten minutes later, however, his expression changed, the face became pale, then flushed, and he could no longer remember anything connected with his fall or any event three or four days preceding it. For events prior to that period his memory was quite clear. Five or six days later the lost days were recovered, and his memory was as complete as before the accident.

Involuntary Speech—Zwangreden.—Klinke²⁰⁵ relates the history in detail of an old woman, the subject of mental weakness and apparently acute paranoia, who exhibited this peculiarity of speech. Klinke accepts the explanation of Cramer that involuntary speech is due to an irritability of the muscle sense pertaining to the speech apparatus. In another paper,²⁰⁵ on disturbances of speech in hypochondria and insanity, he gives the histories of

several patients so affected, the speech defect consisting of a lisping of words as in childhood. Two hypochondriacs exhibiting this peculiarity, explained it as being due to paræsthesia and subjective anaesthesia of the tongue. Two others (melancholiacs), after recovery, stated that they had been of the impression that they were again children. The author again accepts the explanation of Cramer, that this peculiar speech, reminding one of that of childhood, originates in a delusion.

Motor Aphasia. — Luys³, exhibited, before the Biological Society of Paris, the brain of a soldier who had been affected with complete motor aphasia following a fall from a horse. He had been able, however, immediately after the fall, to express his wishes in writing,—using the right hand,—and this faculty he retained until his death, some time after the injury. He had left hemiplegia; no defect of sensation. The autopsy showed the left hemisphere normal, but there was much loss of substance in the right, particularly in the region of the insula. The man had never been left-handed. The author cited this case as one of many showing that the faculty of speech was not exclusively located in the left hemisphere. Luys, at the same meeting, showed the brains of 2 congenital deaf-mutes which presented evidence of defective development of the third left frontal convolutions.

Déjerine³ related the histories of 2 cases of motor aphasia, with autopsies, possessing a peculiar interest in the fact that the causative lesions were distinctly subcortical. The first patient, a man of 67 years, had been a hemiplegic (right) ten years. He had suffered from motor aphasia during the same time. He was intelligent, could understand spoken or written language, could write spontaneously from dictation or by copy, but could not pronounce a single word, either spontaneously, by repetition, in reading or in singing. No paralysis of muscles of tongue or palate existed, but the right vocal cord was paralyzed. The autopsy revealed a perfectly normal cortex on the left hemisphere, including Broca's convolution and the region of the insula. Horizontal section through Broca's convolution showed, at the base of this convolution, an old focus of softening one centimetre in diameter and two centimetres from the cortex; a centimetre farther back was a second focus. A section one centimetre above the first showed an ancient grayish focus in the white substance, on a level with the anterior half of

the base of the third frontal, independent of the other two, and on a plane anterior to them. These diseased centres interrupted not only the fibres which went from the convolution of Broca, but also those from the inferior extremity of the ascending frontal and parietal, the region in which Horsley and Semon located the centre for the larynx. In the second patient the symptoms were very similar, except that the hemiplegia in the latter was more marked and the patient wrote with the left hand. The autopsy showed in this case a normal cortex, but a centre of softening in the white substance subjacent to the third frontal, prolonged, on a level with the inferior extremity of the Rolandic fissure, into the foot of the ascending frontal.

Mixed Aphasia.—T. D. Poole ³⁸_{Aug., '90} relates the history of a case of mixed motor and sensory aphasia occurring as an associated condition with an attack of influenza. The aphasia was marked and persisted for several weeks, the patient eventually recovering. Muehleck, of Philadelphia, ¹¹²₁₉₀₀ describes a case of motor aphasia with agraphia and dyslexia occurring in conjunction with attacks of petit mal. Eye-strain existed in this patient's case, and much benefit was derived from the use of properly-adjusted glasses. Bernheim ⁹²_{May, '10} reports a case of motor aphasia (partial) with agraphia (complete), alexia (partial), and some indications of occasional auditory aphasia or word-deafness. The patient, a man 54 years old, had right hemiplegia, gave a history of syphilis, and had been addicted to alcohol. Autopsy showed a vast focus of softening in the left hemisphere, corresponding to territory of the Sylvian artery. The motor aphasia was explained by the destruction of the third left frontal, the motor agraphia by the destruction of the white matter connecting the inferior parietal with the second left frontal, the partial auditory aphasia by the destructive lesion involving the first temporal lobe. The incomplete alexia or, rather, visual amnesia, the author attributed to the destruction of the inferior parietal lobe. A striking and unusual phenomenon present in connection with this visual defect of speech was manifested in the patient's inability to recall the object by the written word, while he quite readily recalled the name of an object when it was shown to him.

Parisot ¹⁸⁴_{May 1, '11} relates the symptoms of a female patient, aged 71, who had facio-brachial paralysis and aphasia following an apoplectic

stroke. She could pronounce only two words,—“sugar” and “pain.” She could not read or understand written words, yet she recognized individual letters. She had no word-deafness, understanding spoken language. At the autopsy he found softening in the inferior third of the ascending part of the left ascending parietal, the inferior fifth of the ascending frontal, and the junction of these two convolutions at their inferior extremity—explaining the facio-brachial paralysis. The foot of the third left frontal was involved in the softening, and there was a small spot of softening at the superior border of the island of Reil.

Leube³¹⁹ relates the case of a woman, aged 54, who began to suffer pain in the right leg and arm, which, in the course of two years, became paralyzed, there being also disturbance of tactile pain, muscular and temperature sense on the left side, with right choked disc, occasional attacks of fever, headaches, exaggerated reflexes, and defects of memory and speech. The speech disturbance was as follows: At first there was marked interference with spontaneous speech in reading aloud and in repeating the words of others, though she could understand words. After this disappeared under mercurial inunctions decided alexia manifested itself. Single letters and short words could be pronounced in reading, but with long words this was impossible. She could readily, however, name the object corresponding to the unpronounceable word. Her defect lay in the fact that she forgot the first letters so quickly in a long word that she could not combine them at all. The author considers this case as confirming the opinion expressed by Grashey that, under all circumstances, we read by spelling. Fogliano⁵⁰⁵ reports a case of mixed motor aphasia, with paraphasia, which he greatly benefited by trephining.

Alexia.—Adler⁴ records a case of Wernicke's subcortical alexia, in a man aged 52, the result of probable embolism. The symptoms were uncertainty in seeing letters in copying, although he could write correctly from dictation; he could not name objects, although he knew what they were, as shown by reference to the purpose for which an object was used. There was some color-blindness and complete right hemianopsia. Ivan Mierzejewski, ⁷⁵ _{Dec. 15, '90} under the title *Cæcitas Syllabarisi et Verbalis sed non Literalis*, describes a peculiar variety of word-blindness and syllable-blindness, but with preservation of letter-vision. The patient,

a physician 56 years old, had suffered from nephritis for years, and gave a history of syphilis. In January, 1890, he had an attack of uræmic coma lasting several days. Two other attacks have since occurred, and some time after the last attack the patient noticed that he had lost the power of reading, although he could distinguish the letters easily and his general vision was not disturbed. On examination, Mierzejewski found the following condition: Each individual letter can be clearly seen, but he utterly fails to combine the letters into words or even syllables. He can write from dictation or copy, but cannot read what he has written. He can write prescriptions, but does not recognize them or their meaning afterward. He can read and pronounce numbers correctly, however. His sight is good, the fundus normal, speech distinct, intelligence unaffected, and no change is present in motor power, sensation, or the reflexes. A case somewhat resembling the above is reported by Déjerine,³¹ with the results of an autopsy. No lesion or evidence of disease was found, except a wedge-shaped focus of softening in the parietal region of the left hemisphere, penetrating as far in as the lateral ventricle, destroying the greater part of the optic fibres in its vicinity. There were areas of softening implicating the right optic tract also.

Word-Deafness.—Netter³² reports a case of word-deafness in a female patient, following apoplexy, with right hemiplegia. Although retaining apparently all her mental faculties, the patient could not understand spoken language at all. At the autopsy there was found softening of the entire first temporo-sphenoidal convolution on the left side. A second focus of softening, extra-ventricular, and on a level with the corpus striatum, explained the hemiplegia. Broca's convolution and the region of the insular were sound. Déjerine³⁴² observed, during the past year, a case of word-deafness with alexia, paraphasia, and incomplete agraphia, the lesion being "a yellow patch of softening on the outer surface of the left hemisphere that extended forward as far as the lower two-thirds of the ascending parietal convolution." Broca's convolution was found intact, the paraphasia originating from disease elsewhere.

Idioglossia.—Hale White and Golding Bird, Taylor and Hadden² presented four boys exhibiting a form of defective articulation, to which the term "idioglossia" has been applied by Perry,

of England. These boys were supposed by their parents to be deaf-mutes; but such was not the case, as they heard well and expressed themselves in articulate sounds. These sounds were unlike those of any known language, but the same sound was always used by the same child to express the same word. Phonetic records, reproduced from the Edison phonograph, of the speech peculiarities of these boys, constituted an interesting and unique illustration of the possible usefulness of this invention of science in the field of medicine.

Stammering and Stuttering.—Gutzmann²², makes a distinction between these two conditions, and believes them to be contagious by example—*contagion morale*. Stuttering he describes as due to involuntary muscular contraction and stammering to defective respiration. Children so affected should not be allowed to attend the public schools. Twice as many males as females are affected, and the condition, as a rule, disappears shortly after puberty. He attacks the opinion expressed by Küssmaul and others, that the Chinese have no stutterers, citing in refutation of such opinion the fact that the Chinese word “kilu ko” means “stutterer.” Bitot¹⁸⁸ _{Dec. 1, '90} relates the histories of several cases of stuttering of hysterical origin and 1 case of mutism from this cause. Chevrin¹⁷ _{Apr. 11} does not, on the other hand, believe in a hysterical origin, considering the condition as having a distinct symptomatology. He gives the following as principal signs of ordinary stammering: (1) commencement in infancy; (2) respiratory troubles; (3) intermittence; (4) total disappearance during singing; (5) absolute independence of any trouble whatever of the sensory-motor apparatus. Other papers upon the subject of stuttering, stammering, and deaf-mutism are by Behnke,¹¹ _{July} Winckler,⁸⁴ _{Apr. 11} Uchermann,⁶⁹ _{May 14} and Kramer.⁸⁸ _{Nov. 16}

Astasia-Abasia.—Thyssen⁹⁴ _{Mar.} does not consider Charcot's classification into paralytic and ataxic groupings, with a subdivision of the latter into the tremulous and choreic varieties, as sufficient to meet all cases. He therefore proposes the following:—

ASTASIA AND ABASIA	{	Paraplegic.		
		Ataxic	{	Tremulous.
		Choreic.		Saltatory.

Thyssen⁹⁴ adds 4 cases of this affection. Bonmaison⁹⁴ _{July} reports 2 cases with well-marked hysterical phenomena in addition

to the inability to walk. Eulenburg⁷⁵ reports a case occurring in a young girl who suffered from Graves's disease. Faradic electricity cured the patient in two sittings. G. M. Hammond²² had a patient presenting the symptoms of this affection. J. Séglas³¹ describes a case differing in some respects from the clinical pictures given by Blocq and Charcot. The added feature of most conspicuous character was mental anguish on attempting to walk. To this condition he gives the name *astasie-abasie emotive*.

Agoraphobia.—Courtois-Suffit¹⁰⁰ gives the history of a case of this singular psycho-hysterical disorder. The patient was a man of middle life; whose father had died of locomotor ataxia, and who had himself passed through conflicting emotional states from loss of money, position, etc. Fear to traverse an open space had become so strong as to cause him to enter the hospital. As in other typical cases related by Charcot, Legrand, Du Saulle, etc., he was cognizant of the absurdity of his fear, but had not the power to vanquish it.

CEREBRAL LESIONS.

Intra-cranial Circulation.—Jas. Cappie²¹⁰⁵ contributes a most interesting series of studies—clinical and philosophical—upon the intra-cranial circulation and its relations to the physiology of the brain. Cybulski,⁶³ from experiments upon animals, reaches the following conclusions: 1. Cerebro-spinal fluid is always under a certain positive pressure, which, according to the conditions of the circulation in the brain, as well as the absorption and diffusion, can undergo considerable fluctuation. 2. The diminution of the skull-cavity by the presence of foreign bodies, or acute inflammatory products, can augment the intra-cranial pressure to a great extent and last very long, owing to the changed conditions of absorption. 3. Increased intra-cranial pressure impedes the circulation in the brain and causes anæmia, with a series of phenomena, which we call the phenomena of general brain-pressure. 4. That with intra-cranial pressure anæmia of the brain also exists is proven by observations made directly on the superficial vessels of the brain; the circulation of blood in the carotids is also quickened. 5. This anæmia, from low degrees of pressure on the brain, is of less importance than the general augmenting pressure in the arterial system. 6. The experiments of the

adversaries of the old theory do not disprove the arguments of this theory; on the contrary, some of these experiments speak in favor of it. 7. Circumscribed pressure on the brain, produced by tents of laminaria digitata, has a latent effect only when the volume of the laminaria digitata is no more than one-nineteenth to one-twentieth of the volume of the brain. 8. If its volume is greater, changes appear in the cerebral circulation, which sooner or later lead to the death of the animal. 9. The phenomena which Adamkiewicz gives as the phenomena of pressure on the brain are most likely only the phenomena of direct irritation of the brain produced by laminaria digitata.

Intra-cranial Hæmorrhage.—At a meeting of the Medical Society of Berlin, ^{July}, the causes producing a peculiar predisposition to hæmorrhage in the region of the opto-striate bodies were discussed. Mendel related results attained in numerous personal researches and experiments. The blood-pressure measured by the manometer he had found to be the same in the carotid and the artery of the corpus striatum, while in the cortex it was lower. Why ruptures do not occur so often in the pons, where the arteries are terminal also, is explained by the tortuous, fluxuous course of the basilar artery. The loss of consciousness, convulsions, and vomiting immediately following an apoplexy Mendel believes to be due to an anæmia of the brain-substance surrounding the site of hæmorrhage and resulting from it. He deprecates the use of the ice-cap as a means of treatment, believing that the effect of cold is to determine a contraction of the cortical vessels, and thus increase the blood-pressure and volume in the central ganglia. Senator advocated external cold as having been established as of value by clinical experience, and he believed that an ice-cap reflexly excited contraction of the deep vessels.

Virchow said that when the arteries receive an exaggerated blood-impulse two processes may develop in their walls: (1) a simple proliferation of the constituent elements, so that the walls thicken at the same time that the vessel is dilated; (2) an inflammation of the internal tunic followed by sclerosis. These two processes may be combined, but their application to the pathogeny of cerebral apoplexy is not as simple as one might think. In cases of collateral anastomoses we find serpentine dilatations about the inflections which receive the brunt of the blood-shock; in cerebral

apoplexy this serpentine form is rare, and we often find only one little saccular aneurism. This occurrence is with difficulty explained by the general conditions of the blood-pressure. Moreover, we sometimes find, on the surface of the cerebrum, in the pia mater, an apoplectic focus, and, on close examination, we discover only one little miliary aneurism. To this we must add that the cerebral haemorrhage is generally unilateral, while the blood-pressure is as great on one side as on the other. Mendel, in opposition to Senator, said that arterio-sclerosis had nothing to do directly with apoplexy. Virchow showed this in 1856, and it is also the view of Charcot.

Of interest in its bearing upon the varied etiology of cerebral haemorrhages, and as illustrating one of the protean aspects of our modern medical arch-fiend, *la grippe*, is the report of 3 cases of cerebral apoplexy, accompanying this affection, by Prentiss, of Washington.⁹ Gerlach¹¹² reports a case of sudden death in an elderly patient who had suffered from symptoms indicating cerebral tumor, but whose brain showed nothing except an intense congestion of the membranes and a large effusion of cerebro-spinal fluid, widely distending the lateral ventricles. Death was attributed to "cerebral hyperæmia."

The Diagnosis and Treatment of Cerebral Haemorrhage.—Dana⁵⁰ analyzes a series of 74 cases, 50 of which were haemorrhagic. He points out that brief, severe attacks of loss of consciousness, with some hemiplegia, indicate obstruction, and preliminary mild seizures also indicate obstruction. Consciousness is less permanently and severely affected in cortical and meningeal than in central haemorrhages, unless the former are very extensive; it is most severely affected in ventricular haemorrhages, and in the latter consciousness is speedily lost. If convulsions supervene the clot has broken through the cortex to the surface of the brain. If consciousness is not lost at first, but is so shortly after the onset, the case is probably one of embolism. Convulsions never occur at the onset. They are due to haemorrhage or, occasionally, to cortical softening. Early rigidity occurs in about half the cases of ventricular haemorrhage, and is more marked on the paralyzed side; less often in other forms of haemorrhage; still less frequently in thrombosis, and most rarely in embolism. In haemorrhage the pupils are contracted and irregular, especially if the

lesion is cortical or meningeal. The pupil on the side of the lesion may be dilated. Alternate conjugate deviation signifies a surface lesion. Some loss of cutaneous sensation occurred in a fifth of the cases of haemorrhage, and in a much larger proportion of cases of softening. The peculiarities of the temperature in acute softening, as distinguished from those in haemorrhage, are the rarity of primary subnormal temperature and its presence, if it does exist, only on the non-paralyzed side; also, the slighter tendency to inequality of the temperature on the two sides and its slower rise, if a rise occurs.

Robert L. Bowles,²¹⁰⁶ whose name has long been favorably associated with the subject of apoplexy, and the sub-symptom, stertor, especially, has collected his various writings in this field and published them during the past year in book form. They constitute an exceedingly valuable and practical contribution to the literature of the subject. Other valuable papers published during the year are by J. Leonard Corning,⁸¹ H. Engel,¹⁷⁶ _{Dec. 30; Mar. 25}⁹ Gay,⁶ _{May 22} Bullard,⁴⁴ Biggs,¹ _{Oct. 11} and A. Meisenbach.⁸² _{Apr. 4}

Haemorrhagic Pachymeningitis. — Joseph Wiglesworth²⁷⁸ answers the criticism of Seguin upon a former paper expressing the view that the morbid appearances described under this term are not due to inflammatory action, but are essentially haemorrhagic. Two other contributions upon the same subject appear from the same writer¹⁸⁷: one a summary of cases, with specimens; the other a presentation of the pathology involved. Wiglesworth prefers the term "subdural haematoma." Other clinical papers are by Fränkel, of Berlin,²² Thomas Savill,⁶ _{Sept. 10} and A. Bouchard.⁹² _{July}

Thrombosis. — Collier² exhibited the brain of a young woman who died of general cerebral thrombosis twenty-four days after a confinement, there being no evidence elsewhere of septic infection, no disease of the ears, and no arterial embolism. Handford² _{Mar. 21} exhibited the brain of a man, 60 years old, who had been affected with a thrombosis of the vertebral and basilar arteries. A history of syphilis, with a thickening of the basilar vessels from arteritis, made evident the cause. The patient's death was due to a cutting off of the blood-supply from the respiratory centre from a blocking of the second vertebral and the basilar arteries.

Two successful operations are reported during the year for this condition,—one by Pickering¹⁸¹ _{Sept.} and one by Salzer.⁸ _{Nov. 21} The

method of operation was that suggested by Lauer and subsequently modified by Ballance, each of whom has reported 2 cases, with recovery through operation. Salzer calls attention to the fact that the diagnosis quite often can only be made by exploratory operation.

Traumatic Cerebral Lesions.—A. T. Norton²² relates the histories of several interesting cases of trauma of the brain, with autopsies. He summarizes these results of extended clinical and post-mortem observations in a number of conclusions, which reflect very accurately and concisely the present status of the subject, but which do not add materially to our resources in either prognosis or treatment. Other papers upon this subject of neurological interest are by Eaton²³⁶ and H. C. Wyman.²³⁹ Friedmann, of Mannheim,²⁴¹ reported 2 interesting cases in which, after moderate cranial traumatism, there appeared grave cerebral troubles, showing symptoms between those of a meningitis and those of Ménière's disease, as observed by Schultze in traumatic neurosis. The 2 patients succumbed in an attack of coma, the one at the end of a year, the other in the course of the third year. There had been no disturbance of cutaneous sensation. Autopsy showed, in both cases, complete absence of cranial or cerebral lesion, but microscopical examination in 1 case showed an affection of the small cerebral vessels, which were dilated, the walls infiltrated with embryonic cells and blood-pigment, and were the seat of hyaline degeneration. In this case, therefore, the cerebral concussion had produced a vasomotor paralysis, with hyperæmia of the brain and consecutive lesions of the cerebral vessels. It would be readily seen that the differential diagnosis of this condition from encephalitis and meningitis on the one hand, and traumatic hysteria or neurasthenia on the other, would be important, and yet difficult. Sensory troubles, so common in traumatic hysteria, would constitute one important differential point; being absent in these cases, one might conclude that their origin when present was not vasomotor.

Ernest Laplace²⁵ describes a case of very extensive injury to the base of the brain, from a penetrating wound through the left orbit, successfully trephined thirteen days after the accident. W. J. Taylor,²⁶ T. R. Wilson,²⁶ Redmon,²⁶ A. J. McCosh,²⁶ and D. J. Griffith,²⁶ record cases in which similar success followed the operative treatment of brain-lesions.

Foreign Bodies in the Brain.—Richard Slee⁹ gives the results of an autopsy in the case of a man who died of peritonitis from a pistol-shot wound of the intestines, which revealed quite unexpectedly a knife-blade, one-fourth inch in width and an inch in length, penetrating the lower posterior portion of the occipital lobe. There was no depression or displacement of bone, and the blade was black and corroded, and inclosed in a thick, fibrous capsule, having been evidently in the brain for a number of years, though the man had been in perfect health all his life. Virgil McDavitt⁹ reports a somewhat similar case.

Lesions of the Corpora Quadrigemina.—Eisenlohr³¹⁹ reports a case of gunshot injury of the corpora quadrigemina involving the right tubercles, both of which were destroyed, together with the right hebenula and a part of the right anterior brachium. The injury extended close to the aqueduct of Sylvius and the third-nerve nucleus. At first the only symptoms were defective movements of the pupils, diminished reaction to light in both pupils, and permanent dilatation of the pupil on the same side. The other symptoms common to lesions here did not manifest themselves until secondary changes occurred. Eisenlohr believes that the pupillary symptoms are the most important in localizing value of those resulting from lesions of the corpora quadrigemina. Ataxia is also constant and important, and a very limited involvement of the posterior tubercles will produce it. Affections of the anterior tubercles and of the anterior brachia may produce a certain diminution of vision, independent of optic neuritis or atrophy, and without involvement of the optic tract. Leyden¹¹³ reported the case of a woman, aged 69, who presented as symptoms left hemiplegia, ptosis, conjugate deviation of the head and eyes to right, who, for three days, showed the hemiopic pupillary inaction test,—Wernicke's evidence of a lesion in front of the corpora quadrigemina. The diagnosis made *intra vitam* of a lesion in the corpora quadrigemina was accurately confirmed at the autopsy.

Pons Lesions.—A case, with autopsy, of circumscribed foci of softening in the pons is recorded by W. B. Dorsett.⁶⁵ The symptoms were: headache, vertigo, cramps in the legs, weakness in the lower extremities, causing frequent falls,—always backward,—and paraparesis, followed by transient diplopia, left facial paralysis,

progressive diminution of vision, difficulty in swallowing, progressive weakness, and death.

Lesion of the Pituitary Body.—Wm. C. Krauss¹⁷⁰ Dec. '90 reports a case of calcareous degeneration of the hypophysis or pituitary body occurring in a man 48 years old, whose only symptoms during life were intense headaches, dizziness, and loss of vision, due to optic-nerve atrophy. The symptoms were present during two years previous to death. The autopsy showed the pituitary body, the size of a large marble, lying between the crura and pressing upon the chiasma. Chemically, the calcareous contents of the body were found to contain carbonate and phosphate of calcium.

Cerebellar Lesions.—Laborde³¹ July 2 relates in detail the results of experiments made upon dogs to determine the symptoms in constant relation to lesions of the cerebellar peduncles. Such dogs, after puncture of the restiform body, showed loss of equilibrium, with a tendency to fall to one side and to rotate the body, and loss of sensibility in the cornea of the same side. Three cases of cerebellar haemorrhage, with autopsies, are reported by E. Kell,⁹ Oct. '91 R. M. Phelps,¹⁰⁵ Mar. 1 and Spencer Graves.⁸² June '90 No new symptomatic observations were recorded in either case. H. Chiari⁶⁹ Oct. '11 describes three forms of change in the cerebellum attending hydrocephalus of the cerebrum. The first type showed elongation of the tonsular and medial parts of the inferior lobe of the cerebellum into uvula-like prolongations, which accompanied the medulla oblongata into the spinal canal. The second type was due to imbedding of parts of the cerebellum in the widened spinal canal inward of the elongated fourth ventricle, which extended into the canal. In the third type, confirmed by but one autopsy, there was more marked hydro-encephalocele cerebellaris cervicalis. It was hardly necessary to say that this displacement by pressure of the cerebellum, as well as of the pons, etc., in hydrocephalus, might give rise to special symptoms. Mendel³⁶⁸ A.J.P. '90 reports the case of a man who died aged 46, having had ataxic symptoms, commencing with the age of 6 years, which had increased. Symptoms had developed referable to the speech, eye, and other muscles, but sensibility remained normal. The diagnosis was made of Friedreich's disease. At the autopsy considerable atrophy of the cerebellum was observed. Other changes were: In the lumbar region of the cord, degeneration of the posterior

columns and roots, atrophy of the anterior cornua and roots, and degeneration of the posterior ganglions. In the dorsal region the degeneration involved the columns of Goll, of Burdach, and the lateral pyramidal and cerebellar tracts. The degeneration attained its greatest intensity in the cuneiform tracts, about the same distribution of the degeneration in the cervical region, and in the medulla oblongata it involved also the different white fasciculi with their gray centres and the centres for the facial and hypoglossal nerves. There was considerable atrophy of the pons. The peduncles were reduced to a third their usual size. The author regarded the changes as systematic, beginning in the cerebellum, pons, and medulla oblongata.

Nonne³⁶⁸ reports an affection, seen in 3 brothers, which offered symptoms common to hereditary ataxia of Friedreich,—disseminated sclerosis and atrophy of cerebellum. The patients were aged respectively 46, 49, and 50 years. In the first the symptoms began at 30 and followed a violent emotion, in the second at 14, and in the third at 10; cause not known. The symptoms consisted of psychical trouble, dementia, great irritability, ataxic disorder of the limbs, embarrassment of speech, nystagmus, limitation of the eyeball upward—upward and outward, upward and inward; ataxia, static and locomotor. Movements presiding over mimicry showed also inco-ordination. Romberg symptoms not shown; no paraesthesia; no contractions; sensation normal; reflexes intact; atrophy of the optic nerve. The third patient died of pneumonia engrafted on tuberculosis of the lungs. To the naked eye there appeared insufficient development and malformation of the organs composing the central nervous system; no evidence of inflammation. The only anomaly revealed by the microscope consisted in a preponderance of the fine nerve-fibres over the larger ones in the anterior and posterior roots and in some peripheral nerves. It seemed to be, therefore, an anomalous development of the nervous system, showing symptoms not heretofore described.

PARALYSIS.

Infantile Cerebral Paralysis.—Henry Ashby¹⁵ adduces facts strongly supporting the opinion recently expressed by Osler, Angel Money, Goodhart, and others, that many of the cerebral palsies of early life are due to hæmorrhage from an accidental convulsion.

This is in opposition to the view that the convulsions are due to the same cause which produces the paralysis. Such an hypothesis, supported as it is by many pathological observations, affords a far more rational and acceptable explanation of the etiological relationship of many of the fevers to resulting paralysis than we have in any other view.

Sachs,¹ considers only the cases of acquired cerebral palsy as offering any possible advantage from operative measures. Porencephalia, agenesis, encephalitic or sclerotic conditions are manifestly incapable of improvement by surgical means.

A case of craniectomy, by McClintock, is worthy of mention²⁰¹ as affording one of the best results yet recorded from this operation,



McCLINTOCK'S CASE BEFORE OPERATION. THREE MONTHS AFTER OPERATION.
(*Kansas Medical Journal*.)

which was first suggested or practiced by Lannelongue, of Paris. The child is reported as having shown "very marked improvement in paralysis and intelligence" two months after the operation, with a continued progressive tendency toward further improvement.

Freund and Rie,²⁰⁷ in a paper upon this subject, propose to classify all juvenile cerebral palsies into choreic and spastic forms. According to their view, a different etiology is involved, the pathology is different, and, to a limited degree, the prognosis differs.

Hemiplegia.—Davezac¹⁸⁸ reports the results of sphygmographic tracings of the radial pulse on the two sides in 2 cases of hemiplegia. In both cases the amplitude of the oscillations was

notably less on the affected side. Humphreys,² in order to test the relative significance of deviation of the tongue, recorded observations in 300 cases of general sickness seen consecutively. Of this number, 40 showed decided deviation,—25 to the right, 15 to the left. Eight of these 40 patients were epileptic and 4 alcoholic. The remaining 28 were free from nervous disease, so far as known. No connection between the deviation and the use of right or left hand was observed. Sharkey⁶ gives results of a microscopical examination of the brain of a patient who was affected with right hemiplegia, due, as determined at the autopsy, to an acute primary cerebral inflammation (encephalitis) affecting the left hemisphere entire. No cause for the encephalitis could be determined. (Strümpell's primary encephalitis?) Hughlings Jackson and J. Taylor² report a case of hemiplegia, occurring in a patient affected with tabes, followed by restoration of the knee-jerk.

Left Hemiplegia with Aphasia.—Beatty² exhibited before the Royal Academy of Medicine, in Ireland, a young girl suffering from left hemiplegia and aphasia. The girl was left-handed.

Hemiplegia and Hemianæsthesia on the Same Side as the Lesion.—Cocciopoli⁵⁰⁵ relates the case of a man who fell and fractured the right parietal eminence, for which he was trephined, making a good recovery and returning to work. Some weeks later he began to have pain at the site of the operation, and an abscess was discovered. When examined, previous to opening the abscess, the patient was found to have complete loss of tactile pain and temperature sensibility over the entire right side of the body from the arm down. There was paresis, quite marked, of the right arm and leg. Hyperæsthesia on the left side of the body was noted. No change in face or tongue, and vision normal. Smell and taste were abolished on the right side, and hearing was less acute than on the left. The abscess was found to be separated from the brain-substance by a cartilaginous floor, which could be easily depressed; and, from the fact that all the symptoms disappeared immediately after the evacuation of the abscess, Cocciopoli attributed these symptoms to pressure. He admits that many of the phenomena of the case are difficult of explanation. The history, as related, is strikingly suggestive of major hysteria, and it is unfortunate that the author did not exclude it in his case. Other papers upon hemiplegia are by Thompson⁹ and James Tyson.¹⁰

Functional Paralysis.—Goff²³³ reports 3 very interesting cases of paralysis in children, of reflex origin, due to irritation from phimosis, adherent prepuce, and elongated, inflamed clitoris. The relationship of cause and effect in these cases is apparently absolutely beyond cavil. It is, however, not a little strange that such cases quite rarely, if ever, fall under the observation of men who are in command of almost unlimited clinical resources. W. H. Noble²⁴² reports a case of similar character occurring in an adult. Krafft¹⁹⁷ relates the history of a young girl, 9 years old, who was the subject of repeated clearly hysterical attacks of right brachial monoplegia and anaesthesia. The attacks occurred at periods of intense educational pressure,—at the time of annual examinations in school. The child was of delicate physique and neurotic heredity. Electricity and suggestion effected a cure in each instance. Raymondau⁶³² reports a case of total paraplegia of two years' duration, occurring in an hysterical woman, cured by hypnosis and suggestion. Charcot¹⁰⁰ calls attention to the difference in the foot-drag of hysterical hemiplegia, as compared with the sidewise circumduction of the internal capsule hemiplegia, as a point of value in a differential diagnosis.

Bulbar Paralysis.—Nothnagel²² rejects the nomenclature of Wernicke in the term polioencephalitis superior acuta, although he acknowledges the services of that observer in this field of study. He believes electricity to be the only rational therapeutic resource known at present, and recommends the galvanic current from mastoid to mastoid, with faradism and interrupted galvanism to promote muscular nutrition and retard atrophy. Remak¹⁹⁰ reports a case of bulbar paralysis, occurring in a girl 12 years old, secondary to an attack of *la grippe*, and ending fatally in a few months. Under the term "chronic progressive bulbar paralysis," Hoffmann¹⁰⁰⁵ relates the history of a boy, 11 years old, in whom the symptoms of glosso-labio-laryngeal paralysis were present, in association with paresis and atrophy of the sterno-mastoid and the deep muscles of the neck, as well as those of the shoulder, arm, and trunk, constituting what should have been, perhaps, more properly designated progressive muscular atrophy of the infantile facial type (Landouzy and Déjerine). The case ended fatally in one year after coming under observation.

Landry's Paralysis.—Joseph Eichberg⁸² records the history

of a case of acute ascending paralysis of undetermined etiology ending fatally within ten days. The symptoms began in the lower extremities, and passed rapidly upward, involving vision and the sensorium, with death from respiratory-centre implication.

CEREBRAL ABSCESS.

V. Malinowsky²⁰⁵₂₁₀ experimented upon dogs, with the object of determining the phenomena of artificially induced cerebral abscess. A fine hole was drilled into the skull, and cultures of the staphylococcus aureus and albus and the streptococcus pyogenes were introduced. He announces the following results: (1) in most cases no effects were observed attributable to the micro-organisms introduced; (2) abscess formation (which took place in only a few cases) could be rendered more certain if a prick was made with a sterilized needle into the substance of the brain ten days before the injection; (3) the kind of coccus used was not material; (4) the seat of the abscess could not be ascertained with any degree of exactness; (5) the first symptoms were irritation symptoms, extending much farther than the part merely surrounding the abscess.

Hill Griffiths²⁰₂₁ reports a case of abscess of the right parietal lobe, secondary to tubercular caries of the flat bones of the vault of the skull, in a boy 16 years old. Jamieson²³⁵₂₃₆ relates the histories of 2 fatal cases, with autopsies, of cerebral abscess due to tuberculosis; both in adults. In both the diagnosis was exceedingly obscure. Surgeon Turner, U. S. Army¹₂₁₁, records the sudden death of a soldier who was considered to be in perfect health, the autopsy showing a multiple abscess of the left frontal lobe. The man, at the time of his death, was reclining on a bench, reading a newspaper. A few weeks previously he had received a gunshot flesh-wound of the arm, in an engagement with robbers, which had healed readily, the bone not having been injured. The abscess was evidently secondary to the injury of the arm, though not a single symptom—mental or physical—suggested its presence. Several cases of abscess secondary to disease of the middle ear are recorded. Barclay⁶₂₀ reports such a case, the temporal lobe being the site of the lesion. In Grubert's case²¹₂₁₀ the substance of the left cerebellar hemisphere was the location affected, and the abscess occurred in conjunction with an acute otitis media. An unsuc-

cessful operation was attempted. J. Orne Green⁹⁹ gives the history of a fatal case of abscess, located in the right temporo-sphenoidal lobe, secondary to disease of the tympanum. Two cases of traumatic cerebral abscess, with autopsy,—1 by L. Henry,²⁸⁵ the other by Graham,³⁹—are reported. In Graham's case operation was attempted, but the abscess was not found until post-mortem. In both cases the original injury was very slight. Grubert²¹ relates a case of abscess of the white substance of the temporo-sphenoidal lobe following a compound fracture of the skull operated upon unsuccessfully.

La Grippe as a Cause of Cerebral Abscess.—The power for evil which we have learned by experience to associate with the prevalence of epidemic *la grippe* during the past three years is illustrated in 3 reported cases of cerebral abscess caused by it. Two cases are reported by Bristowe,², with autopsies. In both the ears and frontal sinuses were found healthy, and all of the ordinary causes of abscess of the brain were excluded. In 1 case, that of a man 24 years old, the abscess, as large as an orange, was found in the upper left hemisphere. The lesion in the other patient, a girl of 14, was located in the right occipital lobe. The third case occurred in the hospital practice of Steel, of Manchester, and is recorded by Williamson.²⁰ The patient, a youth of 19, died of an abscess,—found at the autopsy in the right frontal lobe,—just seven weeks after an attack of the influenza from which he had never recovered. Pus was found, also, in the upper ethmoidal sinus on the right side, supposed to have been the point of primary origin. No disease of the ear was found. A case of cerebral abscess and one of cerebellar abscess, the first by L. Russ²²³ and the second by B. Silva,⁵⁸⁹ are related.

Operative Cure.—Many failures are recorded in this sphere of cerebral neuro-surgery, which are especially noticeable in contrast with the very brilliant record of last year. It is none the less emphatically true, however, that operative interference is the only rational procedure in cerebral abscess. Carl Lohmeyer⁴ reports a case of cerebral abscess, starting in the upper lobus paracentralis and extending downward and forward, which was cured by operation. The symptoms were opposite hemiplegia, ptosis, right optic neuritis, apathy, and somnolence. The cause of the abscess was found to have been a caries of the bone, due to

an injury received nearly thirty years previously. The patient made a perfect recovery, and five months after operation had been steadily at work for some time.

TUMORS.

Pathogenesis.—Szczypiorski,²⁴² in a paper on “Parasites of the Brain,” describes the characteristics of the two varieties which have been found so far: the cysticerci and the echinococci, the former being by far the more frequent. With the cysticerci an undulatory structure of the caudal vesicle is a constant means of identification. They may be developed from intestinal tape-worms, and are located in the cortex. The echinococci generally consist of a single cyst filled with fluid, and are, as a rule, located more deeply in the brain. They enter the circulation from the digestive tract, and reach the brain through these channels. Symptoms of cysticerci are an irregular course beginning at the age of 40 or 50, occasional epileptic seizures, intermittent headaches, psychic troubles, emesis, and contractions, with a duration from a few months to twelve or more years. Symptoms of echinococcus are: constant headache, epilepsy, partial paralysis, increasing dementia, and steady progress after a commencement at the age of 20 or 30. The average duration is two or three years. In both the usual result is death, though the prognosis in the latter is less grave, 20 per cent. of the cases dying in old age from some other disease, without alarming symptoms at any time from the parasites. Tape-worms should always be promptly expelled from the body. For the brain affection, treatment other than trephining and removing the tumor can be only symptomatic. A clinical example of cysticercus of the brain is reported by Max Richter⁸⁸. The tumor was located in the inner membranes, at the base and in the upper cord, and the symptoms were those of mixed progressive bulbar paralysis and lateral sclerosis.

Bielkajow⁸⁴⁴ reports a case of cysticercus cellulosa of the cortex, with symptoms of maniacal excitement, in a patient suffering twelve years from traumatic insanity. Two cases of hydatid cyst are recorded: 1 by Duchamp,⁷³ the other by Escher.⁶ Operation was done in Escher's case, though unsuccessfully. In Duchamp's case it was not attempted, although the autopsy demonstrated the fact that the case was one decidedly favorable for

operative procedures. A case of brain-tumor, remarkable in at least two respects, is reported by A. Kruse.⁶⁹ The tumor was a dermoid,—a pathological formation very rarely found in the brain. It filled the fourth ventricle, extending from the lower end to above the acoustic striae; and yet the patient did not present any symptoms of brain-lesion during life, dying of pulmonary phthisis. Kruse was able to find only 2 other recorded instances of dermoid in the brain.

Tumors of the Cortex.—Nine cases of tumor of the cortex are reported as follows: Beadles,⁶ Bennett,¹⁶ Fraser (2 cases),¹⁸ Charcot and Souques,² Meredith,⁹⁸ Clarkson,⁸⁶ Jacobson,⁹⁶ and Trowbridge.²⁴² In 4 cases the diagnosis was made correctly, both as to the nature of the disease and the location involved: Clarkson, Jacobson, Charcot, and Fraser. Charcot made the correct diagnosis in his case of tumor of the para-central region on the right, from the presence of Jacksonian epilepsy of the left leg, followed by left crural monoplegia. In Jacobson's case Jacksonian epilepsy of the left arm and leg, with left hemiplegia, beginning in the arm first, led to the correct location of a lesion of the right middle ascending frontal and parietal convolution. Right hemiplegia, of gradual onset, with motor aphasia, led to a diagnosis, in 1 of Fraser's cases, of tumor of the left inferior frontal and lower ascending frontal and parietal regions, found to be correct at the autopsy. Parts of the supra-marginal and angular gyri had also disappeared. Clarkson does not give the data upon which a correct diagnosis was reached. Bennett's case is of special interest from a negative stand-point. The patient, an elderly man, suffered from a general weakness, headache, and vertigo, with mental failure, and with a train of symptoms typical of exophthalmic goitre, the autopsy showing a tumor which had obliterated the entire right ascending parietal convolution, with the exception of ten millimetres of its lower ends, and the whole of the ascending frontal, except twenty-five millimetres and ten millimetres below, *no trace of paralysis or paresis* having been present at any time in the limbs corresponding to the centres destroyed. The symptoms were of five years' duration, and yet convulsions did not appear until just before death, and were only six or eight in number, and of no localizing value. Anæsthesia of the cornea on the right was an anomalous symptom in this case. The cases of Mer-

dith and Trowbridge illustrate the difficulties and uncertainty attending cerebral localization in brain-lesions. Both patients were insane, and in both the discovery of a tumor was post-mortem, although in Meredith's case there were three symptoms, which, being conjointly present, should have suggested a gross lesion,—right hemiplegia, epilepsy, and insanity. The tumor in this case was situated upon the operculum of the supra-marginal gyrus. Trowbridge's patient—an insane male epileptic—died of dysentery, the autopsy showing, quite unexpectedly, a tumor involving destructively the anterior portions of the second and third temporo-sphenoidal lobes and angular gyrus and softening by contiguity of the first temporo-sphenoidal lobe. These lesions, the reporter very properly says, should have given rise, according to the teachings of cerebral localization, to symptomatic disturbances of hearing, which, he states, positively were not present, though he admits, practically, that no tests were made, no tumor having been suspected during life, the patient being classified simply as an epileptic. As hearing is a special sense with bilateral cortical representation, and as the involvement was of one side only, it is not remarkable, in the light of Ferrier's experiments upon monkeys, that no gross symptom of deafness was observed in this case. That there was *no involvement of hearing at all* is a statement not warranted by the facts in this case, as no tests were made. The reporter's conclusion, that the case is opposed to the teachings of localization as to the centre of hearing, is totally illogical and unwarrantable. Scientifically considered, it has little value. Beadles's patient, whose symptoms during life were nocturnal headache, with insomnia; optic neuritis; hemiplegia, followed by diplegia; ptosis, aphasia, and defects of vision (slight), with dementia, was found, at the autopsy, to have been suffering from a double lesion,—two sarcomatous tumors: one in the occipital lobe in the region of the cuneus, the other at Broca's convolution. There was not a single convulsion of any character throughout the case, although the tumors were cortical, and involved very extensively the superimposed meninges. This fact is of interest in connection with the conclusion reached by Maglioni,⁹²⁵ from a study of a number of cortical tumors, to the effect that "One may have Jacksonian epilepsy without having a cortical tumor, but it is almost impossible to have such a tumor without epilepsy." Of the 4 cases

diagnosed *intra vitam*, operation was advised in 2,—Clarkson's and Jacobson's. In the latter consent could not be obtained, while in the former premature death of the patient prevented what might have proved a successful result. Charcot's patient was not operated upon, because of the character of the tumor, which was tubercular.

Tumors of the Frontal Lobes.—Bruns⁶⁸ has made a special study of disturbances of equilibrium as a clinical sign of tumors of the frontal lobes. He relates the histories of 4 cases of tumor of the anterior brain, in all of which disturbance of equilibrium was present. Oppenheim is quoted as having found this symptom in 80 per cent. of his cases of this character. Bruns summarizes his conclusions as follows: (1) disturbance of equilibrium, similar to so-called cerebellar ataxia, occurs very frequently in tumors of the frontal region; (2) this symptom is much less frequent from lesions elsewhere, and is nearly always absent in neoplasms of the Rolandic region; (3) the associated symptoms usually permit of a different diagnosis between cerebellar and forehead-tumor ataxia.

Schonthal^{4,10} reports the case of a young man, 19 years old, characterized symptomatically by convulsions, which were not attended by unconsciousness, and which could be temporarily stopped by cold affusions, presenting many other hysterical phenomena and not a single symptom of organic or focal disease. The autopsy revealed a glioma as large as a filbert in the white matter of the left second frontal lobe. C. B. Burr²⁷⁸ relates the history of an insane woman, 66 years old, affected with a carcinomatous tumor of the dura mater, which involved, by pressure and invasion, the frontal bone, almost completely destroying it. Until the frontal bone became involved the patient's only symptoms, at all significant of fore-brain disease, were psychical. A somewhat similar case of sarcomatous tumor of the meninges of the brain projecting through the frontal bone is reported by Broome.⁸² The bone, as in Burr's case, was extensively destroyed. The only neurological symptom was headache.

Tumors of the Centrum Ovale.—Five clinical examples, with autopsies, of neoplasms of the subcortical white matter in this region are reported by Jamison²³⁵ Russ and Negel,²²³ Putnam,⁹⁹ Gray,¹ and Wallace and Hoyt.⁵⁶⁸ An analysis of these 5 cases shows that the clinical picture resulting from lesions here is a

very variable one. Headache, vomiting, optic neuritis, and hemiplegia or paresis were present in 3 of the 5 cases. Wallace's and Hoyt's patient suffered from frequent and severe convulsions, the lesion being in the deep, white substance of the left frontal lobe, not involving the cortex. Slight occasional twitchings and contractions of opposite hand were observed in Jamison's case, in whom autopsy showed, in addition to a tumor of the posterior right centrum ovale, a basilar meningitis. This patient also had double horizontal nystagmus. No convulsions occurred in any of the other 3 cases. Gray's patient exhibited, in addition to hemiplegia of gradual onset, a defective tactile perception and marked loss of the muscular sense. The tumor was found, at the autopsy, one-fourth of an inch below the cortex, at the point of junction of the leg- and arm-centres of the posterior central region. Operation was done in this patient's case, but without benefit. The average duration of symptoms in these cases was about eight months.

Tumors of Corpus Callosum.—Oliver¹¹² gives the history in detail of a patient affected with visual illusions and hallucinations; defects of taste and hearing; absolute loss of smell; weakened vision, with frequent variations in color and form perception; physical inertness and paræsthesiæ of tactile sensation; and, finally, coma and death,—the autopsy showing a large, isolated, sarcomatous tumor springing from the knee of the corpus callosum. It rested upon the body and lesser wings of the sphenoid and the orbital plate of the frontal and ethmoid bones. The case is an exceedingly interesting one, not only because of the rarity of lesions in this locality, but also on account of the marked clinical resemblance presented by the case to one of major hysteria. A second case of tumor of the corpus callosum is recorded by de Silva.¹⁷⁴ The patient, an adult East Indian, exhibited symptoms of gradual mental weakness and stupidity, headaches, vomiting, and convulsions at intervals of two or three months for two years, dying finally in a fit. The only paralytic symptom observed was a slight external squint of the left eye, although his gait was somewhat unsteady. There was no optic neuritis. The tumor was found in the left side of the anterior part of the corpus callosum, projecting into the ventricle. The histories of these 2 cases, with some 12 or 15 others previously reported (see ANNUAL, 1891), emphasize the fact that very few, if any, diagnostic symptoms are known as standing in a con-

stant relationship to lesions of this portion of the brain. Negatively, headaches, optic neuritis, vomiting, and convulsions are of some value, by reason of their absence or limited presence in a majority of instances.

Tumor of Pituitary Body.—Byrom Bramwell⁸⁸ was able to diagnose a tumor in this locality by the presence of a type of hemianopsia present in conjunction with other symptoms of brain-tumor.

Tumor of Optic Thalamus.—James H. Lloyd²⁴² reports the case of a man, brought to the hospital with right brachial and crural monoplegia and paralysis of left third nerve, with no involvement of face or tongue, who died twenty days after admission. The autopsy showed a glioma of the left optic thalamus and mid-brain adjacent, involving also the left cerebral peduncle. A case of multiple tubercular tumors of the brain, the largest involving the left optic thalamus and completely destroying it, is recorded by West.²

Tumor of the Corpora Quadrigemina.—A case of tumor in the anterior pair of the quadrigeminal bodies is reported by Pawinski.⁵²⁰ The patient, a servant-woman 43 years old, first noticed a feeling of general depression, followed by headaches, mostly occipital, and at times severe attacks of tremors of the right extremities which shook the bed. In the course of five months she developed a paraparetic state (the right side somewhat weaker than the left), with a tendency to fall backward with eyes closed. Later, paralysis, with ptosis of right third nerve, occurred, with spasmus nictitus. There was no disturbance of sensation or of sight,—both facts rather remarkable, since the autopsy revealed a gliosarcoma as large as a walnut, which included the nates and compressed the back part of the optic thalamus. The pineal gland was not involved, and lay just behind the tumor. There was marked hydrocephalus internus.

Tumors of the Crus.—Vassal⁷ reports an interesting case of tumor of the right peduncle and optic chiasm, of sarcomatous character and traumatic origin. The symptoms were slight left hemiparesis and slight strabismus of the right eye, noticed very soon after the receipt of the injury. Just two months later he had an attack of unconsciousness, and afterward complained of headache. Left facial paralysis, double ptosis, loss of light reflex,

horizontal nystagmus, incontinence of urine, and convulsions appeared subsequently. A trephine opening over the right middle Rolandic region (presumably, and, it is to be hoped, purely exploratory) failed to explain the symptoms, although the relief of intra-cranial pressure afforded temporary benefit. At the autopsy the tumor was found as described.

Tumors of the Pons.—Chas. de Silva¹⁷⁴ reports 2 such cases, in 1 of which the only symptom noticed, preceding the terminal coma, was occasional mental weakness. The second case presented a group of symptoms strongly suggestive of disseminated sclerosis. A positive diagnosis was not made until the autopsy. In the first case the tumor, size of a walnut, was attached to the right side of pons, in the second to the left. Williams¹⁸¹ relates the history of a boy, 6 years old, who, without showing any indications of general illness, began to stumble and fall occasionally in walking. He complained occasionally of feeling tired, and became fretful. Subsequently he developed paresis, then paralysis, of the left side (complete), paralysis of right sixth nerve, vomiting, and excessive dribbling of saliva, with sugar in the urine. An enormous glioma was found, at the autopsy, involving the entire pons. Porter⁶ reports a case of paralysis of right arm and leg and left side of face, with internal strabismus of the left eye, without anæsthesia or involvement of the fifth, the autopsy confirming the diagnosis of tumor of the pons. Caven³⁹ relates the history of a child who had the symptoms of bulbar paralysis, with slight hemiplegia, the post-mortem examination revealing a tumor of the pons. Clarke² reports a case of multiple tubercular tumors in an adult,—the largest being in the pons,—with symptoms of bulbar paralysis and an elevated temperature, but no optic neuritis.

Cerebellar Tumors.—An analysis of 21 recently reported cases of tumor of the cerebellum, with autopsy, shows, as regards age at time of death, 9 under 14 years and 11 adults. The character of the tumor pathologically was gliomatous in 5, fibrous or fibro-cystic in 3, sarcomatous in 4, parasitic in 2, tubercular in 3, and not stated in 4. The tumor was located in the right lobe in 8 cases, in the mid-lobe in 4, left lobe in 3, vermiform process in 1, in the right hemisphere and mid-lobe in 1, and location not stated in 2 cases. In 1 case, reported by Springthorpe,²⁸⁵ a cyst was found floating free in the ventricle. In Wetzel's case²⁵

almost the entire cerebellum was involved. Operative relief was attempted in Dercum and Hearn's case⁸⁶⁸ and in 1 of Springthorpe's cases, but was unsuccessful in both instances. Etiologically considered, 5 of these 21 cases could be traced to trauma; in 2 there was an hereditary history of tumor and insanity in immediate ancestors, and in 2 tubercular cases a family history of phthisis. No cause could be ascertained in the remainder. These cases are reported by Thompson, ³⁶ Bramwell, ³⁶ Schell, ⁵⁶ Shibley, ⁵⁰⁶ Jamison, ²³⁵ Poole, ⁶ Howard, ²⁸⁵ Ashlworth, ² Gwynne, ² Morton, ¹⁵⁷ Covert, ³⁹ Paret, ²¹¹ de Silva, ¹⁷⁴ Sonnenburg, ⁶⁶ Springthorpe, Wetzel, and Dercum and Hearn. The symptoms were, in the majority of instances, sufficiently distinct to admit of a correct diagnosis during life. In only 3 cases was the nature of the case a post-mortem revelation.

MENINGITIS.

Cerebro-Spinal Meningitis.—J. S. Nowlin ⁶¹ believes this disease to be essentially malarial in origin. The weight of evidence, both positive and negative, is against such a conclusion. Obeke ⁴ reports the histories of 2 cases of cerebro-spinal meningitis, occurring in brothers aged 13 and 10, which are of interest in that the autopsy in both cases showed no indication of primary disease elsewhere than in the central nervous system. This is contrary to the opinion recently expressed by several observers, that sporadic attacks of cerebro-spinal meningitis are not independent primary diseases, but are due to the migration of cocci of pneumonia or the bacilli of typhoid fever to the meninges. Cases of sporadic cerebro-spinal meningitis are also reported by Holt ¹⁹ and Trevilyan. ² Soubbatim ⁶⁰⁴ claims to have had excellent results from the use of iodol and acetanilid in combination,—3½ grains (0.22 gramme) of the former and 2½ grains (0.16 gramme) of the latter every six or eight hours. This formula originated with Kratkoff, of Saratov, Russia. Levitsky ⁵³⁰ reports a single case cured by iodoform internally, in doses of 2 grains (0.13 gramme) three times daily. H. Holdrich Fischer ⁷² reports 3 cases of idiopathic (?) meningitis. Prentiss ⁹ reports a case of meningitis of the rheumatic type occurring in conjunction with an attack of *la grippe*. James Barr ¹⁸⁷ reports 12 recoveries in a total of 13 cases. The method advocated does not involve any striking

novelty, and the marvelously low mortality is difficult of explanation upon any other hypothesis than luck or mistaken diagnosis.

Traumatic Meningitis.—A case of this character is reported by E. P. Furber,² possessing medico-legal interest; the patient, a school-boy, developing the disease as the result of a slight blow on the head, with a light ruler, by his teacher. Trevilyan², contributes a paper upon the pathology of suppurative meningitis of traumatic and metastatic origin. Other cases of traumatic meningitis are described by Ellerhorst,³³⁶ R. E. Couniff,⁹⁹⁸ and J. Madison Taylor.¹⁹

Tubercular Meningitis.—Reinhold³²⁶ recognizes three types of this affection: (a) the very acute form, generally of the convexity, reminding one of simple meningitis or even of apoplexy; (b) the ordinary more subacute form, with especial involvement of the base; (c) the markedly chronic form, simulating a psychosis or a tumor. In adults signs of spinal irritation may appear. As to temperature, acute hydrocephalus exercises a depressing effect upon it, as it does also on the pulse; so also does the development of miliary tubercle in the lung, according to the author. There are variations in the temperature, even as regards any particular time of day. There may be an ante-mortem rise of temperature, but more often there is a decided fall. The rise in temperature is not due to convulsions, but to the direct effect of the disease upon the heat-regulating apparatus in the brain. Loeb sought to explain it by the amount of the exudation between the chiasma and pons, but it has been found in meningitis to be limited to the convexity. As to the pulse, there is a slowing, often irregularity, occurring early in the disease. It is subject to rapid changes. In the latter stages of the disease Cheyne-Stokes breathing may be observed. It may appear, disappear, and finally return.

Sudden death in this form of meningitis is referred to a sudden paralysis of the respiratory centre. Reinhold says that the *tache cérébrale* is only of value when extremely well marked and in contrast with unusual pallor. In convex meningitis the pupils are narrowed; in basal, unequal and dilated. The amount of intracranial pressure is also of importance. In moderate pressure the pupils are small; in much pressure they are wide. Exophthalmos was noted once. Spasm of the face-muscles and paralysis have been referred by Wernicke to cortical trouble, by Strümpell to

peripheral disease at the base. As regards motor troubles, there may be irritation symptoms, spasm and tremor, or paralysis. These latter may be observed, and at the post-mortem no naked-eye changes found sufficient to account for them. It must, however, be remembered that meningitis is generally combined with a well-marked encephalitis, as is proved by the microscope. Sensation may be impaired, and the superficial reflexes, especially the conjunctival reflex, diminished on the weakened side.

Prodromal symptoms are most often due to an old local tuberculosis of the brain. A case of Callender's is referred to, in which there were epileptiform fits for several months before death, and tubercles of the pia were found, but no meningitis. In 2 cases there was disturbance of speech. Occasionally the mental symptoms are most marked.

Dudley,² relates the history of a fatal case of tubercular meningitis, interesting from the fact that the primary disease manifested itself as a strumous dactylitis, affecting the proximal phalanx of the right little finger and the distal phalanx of the left middle finger. He asks if the fingers should have been amputated. Ewald³⁶³ saw a boy 17 years old, the victim of acute miliary tuberculosis, who was affected with a spasmodic condition of the right hand resembling athetosis, and who also had left hemiparesis. He made a diagnosis of tubercles in the external part of the thalamus and the posterior part of the internal capsule. The autopsy confirmed the diagnosis, but also showed tubercles in the upper right ascending frontal convolution, explaining the left hemiparesis and other tubercular deposits scattered over the convexity. A case of meningitis brought on by a fall and ending fatally, the autopsy showing the meningitis to have been tubercular, is reported by Hilbert.⁴ The patient was an apparently healthy boy, free from hereditary taint. The autopsy, however, showed tuberculous deposits in the right lung as well as in the meninges. Three cases of meningitis due to tuberculosis, occurring in adults, are reported by Fraenkel,⁴ Churton,² and England.²¹⁸ Fraenkel's patient walked into the hospital, and became suddenly comatose immediately afterward, dying in two days. The man was unusually well developed, with massive thorax, and showing excellent nutrition. No history of antecedents could be obtained, and the only condition at all suggestive of tubercular disease was a right-sided pleural

effusion, which was found slightly purulent on aspiration. The diagnosis was made of ordinary purulent meningitis, but the autopsy showed the case to be one of very extensive tubercular disease of the meninges affecting the convexity, and with caseous nodules in both lungs and in the supra-renal capsules. Essex Wynter⁶, reports 4 cases operated upon by paracentesis of the theca vertebralis, with the object of relieving pressure from accumulated fluids. There was temporary amelioration of symptoms, although all the cases ended fatally. Adamson², exhibited before the Northumberland Medical Society a boy who, he believed, had recovered from tubercular meningitis. In the discussion which followed, Oliver, Peart, and the president of the Society recorded each an instance of recovery from this disease.

Syphilitic Meningitis.—Stoeber,¹²² as a result of an analytical study of 36 cases, announces the following points as affording reliable data in a differential diagnosis between syphilitic and tubercular meningitis: The latter is rare under 1 year of age; the former may occur very soon after birth. In the tubercular form paralysis seldom opens the scene, while it is often an initial symptom in the specific form. In the latter form there is often apyrexia instead of fever; the opposite condition prevails in tubercular meningitis. In specific cases the cry is rather plaintive, and differs from the true hydrocephalic cry. The pulse is often irregular, but the typical slow pulse of tubercular disease is not observed. Respiration in the specific cases is not so often affected with irregularity, and is very rarely of the Cheyne-Stokes type. The retraction of abdomen, projectile vomiting, constipation, delirium, contractures, peculiar posture, rapid wasting, and the munching belong more properly to the tubercular cases. The diagnosis is important, as it involves both prognosis and treatment. Newton Pitt², reports a case of very extensive chronic gummatous meningitis of five years' duration, with autopsy.

EPILEPSY.

Pathology and Etiology.—Jules Christian¹⁶⁴ states that "convulsion is not the pathognomonic sign of epilepsy. It may be absent; it is absent in a great number of cases. Even in the fundamental manifestations of epilepsy—the grand mal, vertigo, and momentary unconsciousness—one alone is convulsive,—the

first. In vertigo 'in absence' there is no convulsion. It is therefore absolutely necessary to exclude convulsion in attempting to define epilepsy. The essential sign of the disease is somewhere else; it is in the loss of consciousness, sudden and absolute, which accompanies all epileptic manifestations, and without which there is no epilepsy. Whatever may be the extent and intensity of the convulsions in a patient, whatever muscles may be affected, it will not be epilepsy unless at the same time there is loss of consciousness. So also, however slight the muscular spasm may be, it must be considered epileptic if it occurs during this complete eclipse of the *ego*. If this is so; if the essential characteristic of an epileptic attack is its suddenness, its complete instantaneous abolition of intelligence and sensibility; if the convulsion is nothing more than an accessory accidental element, is it not evident that the seat of the disease must be looked for not in the organs which produce movement, but rather in those where intelligence and sensibility have their seat?"

Chaslin,⁴⁵⁷ who has been making an extended study of cerebral sclerosis, contributes a recent paper upon the cortical sclerosis seen in essential epilepsy of long standing. This condition, which he terms "gliosis," he believes is a distinct form of hyperplasia of the neuroglia, due to a constitutional vice of development, usually dependent upon heredity. The hyperplasia is primary, always most advanced in the superficial layer of the cortex, and involves, to a greater or less extent, the subjacent strata. Certain experiments are reported as proving the difference between ordinary connective tissue and this overgrowth, and the distinctions existing between gliosis and other affections in which proliferation of the cortical supporting tissue is present. He suggests, further, an original and useful classification of the cerebral scleroses. Rosenbach⁴⁵⁸ writes a critical *résumé* of the observations of Tadiviski⁴⁵⁹ upon the cerebral circulation during epileptic attacks. Curarized dogs were the subjects of experiment. No new facts were evolved.

Brown-Séquard⁴⁶⁰ admits the error of his theory as to loss of consciousness in epilepsy, published in 1856, in which he attributed it to spasmodic anæmia of the brain. His present theory is, that cessation of cerebral activity in hypnotic or normal sleep, grand and petit mal, and certain other conditions depend upon an in-

hibitory act; which theory, to say the least, does not explain much. Laborde¹⁶¹, produced experimental epilepsy at will in 2 frogs by certain mechanical and surgical manipulations, one of which was a simple puncture of the right bulbar restiform bodies with a fine needle. Wildermuth⁶⁸ finds, as a result of examinations of the brains of 30 epileptics, atavistic anomalies in 36 per cent.; in 28 idiots the percentage was 65. Whittaker⁴²⁶ publishes a clinical lecture upon the etiology of epilepsy. Two cases with negative autopsies are reported,—one by Kramer, ⁴⁰⁶ the other by Meisenbach. ⁸² Other papers upon the general subject of epilepsy, mostly clinical lectures, are by Seguin, ⁹⁹ Hitchcock, ²³⁴ Tyson, ⁹ Walton and Carter, ⁹⁹ Pope, ¹⁹⁰ Norbury, ²⁰² Helen W. Bissell, ²⁴² and Hobart A. Hare. ¹⁹

Symptomatology: The Knee Reflex in Epilepsy.—Vasilieff, Danillo, and Bekhtereff⁵⁸⁶ have been carrying out a series of separate experiments to determine the effects of epilepsy upon the knee reflex. The results were very nearly in exact accord, though the methods of experimentation differed. Vasilieff experimented upon dogs thrown into convulsions by electrization of the cerebral cortex. Danillo used absinthe to produce convulsions. In the tonic stage of the attack, on account of the general rigidity of the muscles, the reflex could not be obtained. In the succeeding clonic stage, however, it was well marked. After a violent fit, with unconsciousness, the reflex was either entirely absent or very slight, remaining absent from ten minutes to a period extending to almost half an hour. It would then, in some instances, appear as temporarily exaggerated. The reflex test, it is suggested, will prove available in a diagnosis of malingering. These observations are not new, but are worthy of record as having been scientifically established through control experiments. Bourneville, whose original observations threw much light upon the temperature variations in epilepsy, has been led by an adverse criticism from Duflocq to make a further study⁹² of the subject. For this purpose he selected 67 cases in whom there were simple isolated attacks. The temperature was taken immediately after the convolution, a quarter of an hour later, and again two hours later. There was almost absolute uniformity in the results. In all of the cases the temperature at the time of the attacks was more or less above normal, and in all it was below normal two hours later.

The Urine in Epilepsy.—Charcot,⁷³ as the result of an elaboration of former studies in this field, confirms his original observations, and finds much diagnostic value in the condition of the urine in differentiating genuine epilepsy, hystero-epilepsy, and what he calls “*épilepsie partielle*,” or Jacksonian epilepsy.

Suppression of Milk as a Result of an Epileptic Attack.—Féré³¹ reports such a case in a woman 28 years old,—an epileptic for ten years,—who had been free from attacks for two years, as a result of steady use of the bromides, but who discontinued the drug during lactation for some months, with a severe epileptic convulsion in consequence. The attack lasted for more than two hours, and during its presence an abundant overflow of milk occurred from both breasts. After the attack passed off both breasts were found entirely flaccid, and containing not a drop of milk. The patient's health remains perfect since the attack, although the lacteal secretion has been permanently absent.

Tremors in Epileptics.—Féré⁹² reports 2 cases characterized by a unique and peculiar form of tremor, which was general, sometimes substituting the genuine attack. The clinical picture resembled that of an ague.

Traumatic Epilepsy.—Keen⁵ reports 2 cases of this variety of epilepsy of long standing, both markedly benefited by operation. The first case—that of a negro woman who received an injury in early childhood and had been an epileptic for years—had not had an attack since the operation, eight months afterward. In the second patient—a man 23 years old, kicked by a horse at the age of 7, the attacks of epilepsy beginning two years later—the result was not so brilliant. The patient had three attacks in six months after operation, all, however, directly due to subsequent operative interference.

Jacksonian Epilepsy.—Yamagina²²⁷ reports 2 cases in which autopsies showed multiple pulmonary distoma of the brain cortex. Péan⁶ relates a case in which the attacks involved only the muscles of the left arm and the pharynx. The patient suffered also from severe headaches. An operation was advised, and, upon entering the cranium, the cause of the symptoms was found to be an angioma of the membrane communicating with the longitudinal sinus, which was removed without loss of blood. The conclusions which Péan draws from a study of his case are as follow:

1. That, besides extra-cranial angioma, there exists a variety of angioma situated in the membranes, and communicating with the longitudinal sinus. These are entirely intra-cranial. 2. These angioma are simple, *i.e.*, they are composed of a loop of capillaries, dilated and tortuous. They do not present definite limits, but gradually become continuous with the neighboring vessels. Their chief feature is, that they communicate with the longitudinal sinus by means of a dilated vein. 3. In contradistinction to the extra-cranial angioma, the intra-cranial tumors manifest themselves by symptoms of cerebral disturbance, varying with the situation of the tumor. Such symptoms are especially localized pain and convulsions of the Jacksonian variety, and those symptoms, unlike similar ones to which solid growths give rise, vary with the position of the head, being augmented by flexion and by compression of the internal jugulars in the neck. 4. The prognosis is grave, because of the effect which they produce on the brain, and because of the possibility of rupture and fatal haemorrhage, as was found in 1 case. 5. These tumors are amenable to operation, and may be removed without greater risk than that of an ordinary operation.

Erlenmeyer⁴ relates the case of a physician, 25 years old, who, early in January, had an attack of neurogastric influenza, from which he did not recover for some weeks. On February 1st, while eating, he felt a numbness in the left hand and forearm, followed by a twitching in the muscles of the same region and loss of consciousness, lasting two or three minutes. Small haemorrhagic spots appeared on the skin in different parts of the body and in both conjunctivæ. Another attack occurred on the 8th, similar to the first, though without unconsciousness. Repeated vomiting followed during the next few days, the patient finally making a perfect recovery. Erlenmeyer believed the case to have resulted directly from the attack of influenza, and that the epilepsy was due to capillary cortical haemorrhages, similar to those found elsewhere in the body.

Duflocq⁹² relates the case of a man, 40 years old, who died from an operation done to relieve attacks of partial epilepsy, characterized by the following symptoms: An aura of a loud sound heard in the left side of the head, and a sense of constriction, followed by a drawing of the tongue backward, the head turning

toward the left and inclining upon the left shoulder, the left corner of the mouth drawn toward the ear. The movement extended to the left neck- and shoulder- muscles, but went no farther. No unconsciousness or loss of memory, but the patient could not speak intelligibly during attacks. Autopsy showed an old encapsulated blood-cyst (fall, twenty years before) lying in the white matter of the right hemisphere at a point corresponding to the lower ascending frontal convolution. Healthy white matter existed between the tumor and cortex, which latter was not diseased at all. It had been supposed from the symptoms that the lesion was in the cortex of the lower third of the ascending frontal convolution, as this region includes the centre for movements represented. Three analogous cases are referred to. A case of cortical epilepsy of congenital syphilitic origin is reported by Fischl,³⁶⁶ B.S.P.L., having a set of symptoms different from any recorded in the literature of hereditary syphilis, one of which was attacks of painful muscular contraction in the right lower extremity, without unconsciousness or paralysis.

Cardiac Epilepsy.—Talamon³¹ relates the case of a man, 63 years old, who fell ten feet, striking on his head and remaining unconscious, six weeks after which he became subject to frequent attacks of cardiac-palpitation crises, of the type designated by Troussseau as cardiac or partial epilepsy. Talamon, however, considered the case as one of essential tachycardia.

Masked Epilepsy.—A. O. Fliesburg¹⁰⁵ describes the symptoms of a patient suffering, according to the diagnosis of C. E. Riggs, with masked or irregular epilepsy. The attacks occurred at variable intervals through several months, and were always practically the same. He complained of a "feeling of goneness," pain in the cardiac region, thought he was going to die, was affected with tumultuous speech, saw visions of heaven and angels, and the entire body was affected with epileptoidal twitchings. Hysteria was excluded. The first attack followed immediately upon the introduction of 10 minims (0.65 gramme) of a 10-percent. solution of cocaine into the urethra, which had, however, been used upon previous occasions with no bad effects.

Epilepsia Procurativa.—John Ferguson¹ contributes a paper with this title, based upon 4 examples of the disease. The peculiar feature of interest in 1 case was the development of a

running status epilepticus. The fourth case is of special interest, as affording an example, very few of which have been reported, of the run before and after the epileptic attack. Considering the possible pathology of this special form of epilepsy, Ferguson very ably advocates the theory of a cerebellar origin, considering the precursive element as something of an aura, and analogous in localizing and physiological significance to the aura of light-flashes, sound-disturbance, and other phenomena of special sense, or to the motor initial movements in cortical epilepsy originating in the motor zone.

Status Epilepticus.—Trowbridge and Mayberry²¹ summarize an extended paper upon this subject, with the following conclusions: 1. On account of its association with epilepsy, status epilepticus should not be considered a distinct disease, but merely a climax of the neurosis. 2. It consists of two stages: (a) a convulsion and (b) a comatose, though the latter is sometimes replaced by a period of maniacal excitement. 3. That there is no demonstrable lesion causative of the status. 4. That the prognosis is unfavorable. 5. That the treatment is in a measure symptomatic, but considerable reliance can be placed upon the hypodermatic use of the hydrobromates of hyoscine or conine combined with the sulphate of morphine.

Robt. T. Edes²² reports observations upon a case of this character in which, although the patient took no food, enormous quantities of urea appeared in the urine. Excess of urea has been often noted in such cases, but in this instance it was more than half as much again as is passed by one on a full meat diet. Edes suggests the term "epileptic fever" as being not inappropriate for this condition.

Hystero-Epilepsy.—Aronson, of Russia,²³ describes 2 cases of epilepsy, 1 of which he considered an example of "contagious epilepsy," as originally described by Wichman, who observed an epidemic of imitative epilepsy some time ago. Aronson's cases were two sisters, one of whom attended the other in an initial attack of epilepsy, and was herself seized with a similar attack a few hours later. The term "contagious epilepsy" is so obviously an insult to medical and scientific intelligence that it is noticed only in condemnation. Cases of imitative epilepsy are usually, if not always, to be classed as hysterical. Voisin¹⁰⁰ relates the history

of a case in which the hysterical and the epileptic attacks were quite distinct for many years, the mental state following the hysterical attack being one of buoyant joy and contentment, while that succeeding the epileptic seizure was, as is usual, one of melancholy depression. The epileptic attacks, however, were observed to be steadily gaining the ascendancy. H. F. Byers¹⁹ reports 3 cases, under the term "hystero-epilepsy," which, as described, were instances of pure hysteria major of the convulsive type. The term hystero-epilepsy, to retain any clinical or other value, should be restricted in its application exclusively to those cases which present a conjoint association of genuine epilepsy with hysteria. Tebaldi⁹⁶ reports a case of "a rare form of hystero-epileptic convulsions occurring at long intervals," presenting a feature of interest in an aura of intense thirst.

Epileptic Psychoses.—Wildermuth⁸¹⁹ contributes an interesting paper on "Epileptic Delirium." The chronic psychical degeneration occurring in epileptics needs no special description or comment. The transitory delirium or incoherency is more interesting and demands more attention. It may be divided into two large classes: (1) the psychoses, which are combined with more or less complete loss of consciousness; (2) the psychical alterations, which are not so accompanied. To the first division belongs the epileptic stupor which often occurs in connection with severe attacks, and which may reach any stage, from total loss of consciousness to the capability of performing simple conscious acts. When consciousness has returned, or partially so, hallucinations are frequent, generally having a grotesque purport, and driving the patients almost to the verge of death from fright, or putting them in a delirium of joy. These forms generally follow an epileptic seizure, seldom replacing it and never preceding it. The second group is far more often met with. In the less-marked cases there is only a change of "natural inclination." According to the relation of time which the mental defects bear to the epileptic fit four forms may be distinguished: 1. The psychical changes are equally distributed over a series of attacks. 2. The morbid condition of mind is entirely different before and after the fits: before, it is depression; after, exaltation; or this order may be reversed. In the same patient the same sequence is nearly always followed. 3. The delirium is only apparent after the attack has completely passed, and usually takes

the form of querulous mania. 4. The psychical phenomena may take the place of a fit. The mental complications are very different when occurring with purely cortical epilepsy ; the disturbances of the intellectual balance appear late, seldom reach an extreme grade, and recovery usually occurs.

Clouston ³ considers the subjects of "Developmental Epilepsy and Epileptic Insanity." Ninety per cent. of all cases appear, according to his observations, before the period of mature development. This is above the figure of Gowers, who places it at 75 per cent.

J. Peeke Richards, ⁶ had an exceedingly interesting case of petit mal, associated with an unconscious impulse to commit suicide. The patient, a woman aged 28, inherited insanity. Her father and eleven sisters died of phthisis. She had been subject to "fits" since she was 14. During the first three months of her admission to the hospital she had 3500 attacks, mostly petit mal, chiefly affecting consciousness, and with only slight convulsive movements. Two or three minutes after an attack the peculiar feature of her case would occur : while remaining in a state of complete unconsciousness she would go through a series of perfectly co-ordinated movements, all of which were of a suicidal kind. Taking one of the bed-sheets by one corner in one hand (always the left), she felt about with the other in order to find its borders, and, having discovered these and arranged them satisfactorily, suddenly, by drawing the sheet through the right hand, she converted it into a semblance of a rope, and throwing it rapidly over her head, pulled so strongly upon the two ends as to absolutely prevent all possibility of respiration. Two strong attendants could scarcely control her suicidal inclinations with force, until she would become so weak from partial asphyxiation as to be able to make no further resistance. She would recover consciousness partially in two or three minutes, but would not know her attendants ; would not know the hour, if day or night ; did not know where she was, or of anything she had done. Afterward she gave up trying to strangle herself, but would rush out of bed and dash her head or body against the wall, if not prevented, in the same automatic way. Again, she tried several times to swallow everything in reach, to poison or choke herself. The suicidal impulse was present only after attacks of petit mal. She was bright and cheerful, though

weak-minded, in the intervals of attacks. Trowbridge ⁸⁰ describes a case of double consciousness with epilepsy, the patient, a male 52 years old, representing a sort of Jekyll-Hyde existence. His attacks of epilepsy occurred about once in six weeks. He always had from three to six convulsions at each period, all of the grand mal type, and very violent. In from two to four days after the attacks he would pass into a state of "second self," becoming very violent and abusive, and had to be physically restrained. He would remain in this condition six, eight, or ten days, according to the number of convulsions preceding it, and then would return to his first self, in which state he was a man of pleasant and peaceable disposition, and did work about the wards. He had no recollection of his surroundings during his state of second self. A case somewhat similar in many of its clinical phenomena, but of greater scientific and medico-legal value, in that it illustrates an almost pure type of psychical epilepsy, is related by E. T. Brady.⁸¹ An additional point of special interest in connection with the latter case is the observation made in each instance of "second consciousness" of an associated unilateral sweating (hemidrosis), affecting the left side of the median line. Meynert, ⁸⁴ in a criticism of Lombrosos's work on men of genius, rejects the latter's view that genius is to be regarded as a psychosis,—as an equivalent of epilepsy.

Treatment.—Agostini ⁵⁹¹ regards bromide of potash as "over all others the most efficacious remedy." In 85 per cent. of cases studied, a quantity corresponding to 20 or 25 centigrammes ($3\frac{1}{2}$ to $3\frac{1}{2}$ grains) per hectogramme of weight of the patient was found, if intermitted every third day, to be harmless in physiological experiments, and produced either a cessation or a notable diminution of the attacks in epilepsy. Purity of the salt and integrity of the renal apparatus should be carefully investigated. Carl Pick ¹⁰⁰ states that the quantity required in epilepsy is very much less when it is combined with treatment by hydrotherapy and hygienic methods. Another writer ⁸² considers hydrotherapy as without value in epilepsy, though useful in hysteria. He considers potassium bromide the best anti-epileptic agent, and formulates the following rules as to quantity and method of administration: During the first year of treatment daily doses of from 3 to 4 grammes (46 to 62 grains) are sufficient. In nocturnal attacks the

main dose should be given in the evening. When a year has been passed without a paroxysm the bromide should be given every other day during the first half and every day during the second half of each month. Eighteen months after any paroxysms have occurred the medicine should be given every third day in the first and every day in the second half of each month. Finally, after two years without an attack, the medicine is given every fourth day in the first and every day in the second half of each month. Harriet Alexander⁸⁶ calls attention to the dangers of the bromides in epilepsy, and cites illustrative cases. V. Poulet⁸⁷ proposes the conjoint use of the bromides with an organic agent capable of depressing the nerve-centres,—as calabar bean, picrotoxin, belladonna, and other similar agents. He believes the bromides to be the chief remedies, and that, when patients become habituated to their action, their combination with the organic substances mentioned is productive of the most gratifying results. It was likewise observed that these remedies seemed to prevent the frequent maniacal states following attacks of grand mal, and also to stop the appearance of immediate accidents, such as hemiplegia, delirium, stupor, and coma. Dijoud⁸⁸ reports the results of the use of borax in 25 cases of epilepsy. He claims to have cured (?) 1, and to have relieved all but 6. Treatment was continued from one to seven months. These cases, he states, had been unsuccessfully treated with bromides. He was able to carry the dose of borax up to 90 grains (5.40 grammes) daily without inconvenience. Dijoud's results are open to criticism as to their value from at least four stand-points: (1) sufficient time has not elapsed to warrant any statement of cure or permanent benefit; (2) that the bromides were not successful proves nothing until the method of administration is stated to have been correct; (3) one hundred drugs may be mentioned which will, after the bromides have failed, benefit the patient to a greater or less degree for a longer or shorter period; (4) spontaneous remissions are known to occur in epilepsy without explainable cause, and lasting, at times, for many years. Therefore, a cure cannot be substantiated in so short a time, or without more extended experiment. Borax is none the less of unquestionable value in epilepsy, and its advent into our therapeutic resources in this affection is a welcome one. A too exuberant enthusiasm as to its value should be checked, however, lest it ob-

scure the usefulness of more thoroughly proven remedies. Mariet⁷³ considers borate of soda "superior to kali bromide in symptomatic epilepsy, but of less value in nervous epilepsy."

Julius Donath⁵⁷ has been experimenting with various organic bromine compounds, with the object of finding some salt of bromine free from a resulting cachexia. Ethylene bromide ($C_2H_4Br_2$)—a light-brown liquid of burning, sweetish taste, and containing 90.9 per cent. bromine—he found to be of decided value in shortening or rendering milder the attacks in 21 cases tested, and in none was acne or bromism produced. The dose is from $1\frac{1}{2}$ to 5 grains (0.097 to 0.32 gramme), two or three times daily, best given in some bland, oily emulsion, or spirits of peppermint, well diluted. It is insoluble in water, but mixes freely in alcohol and the fixed oils. Gustav Olah¹¹³ finds that ethylene bromide diminishes the attacks in number and severity.

McCall Anderson and W. R. Jack⁵ report a case of epilepsy cured by antipyrin, in doses beginning with 5 grains (0.32 gramme), three times daily, increased 1 grain (0.065 gramme) daily, the good effects being attained when a dose of 25 grains (1.62 grammes), three times daily, was reached. The case was traumatic. Treatment was inaugurated in December, and the patient cured (?) by March following. Charles S. Potts¹¹² has found H. C. Wood's suggestion of a combination of antipyrin, 6 grains (0.39 gramme), with bromide of ammonium, 20 grains (1.3 grammes), three times daily, an excellent one in idiopathic epilepsy. Charles S. May²⁰² confirms the observations of Wood and Potts, having tested the combination in 10 aggravated cases.

Dunn¹⁰⁶ and Umphenbach¹¹⁶ both reach the conclusion, from experiments with amylen hydrate in epilepsy, that it is valueless and even dangerous. Umphenbach noticed from its use increased mental confusion and decided disturbance of sleep. Dunn experimented upon 14 cases of chronic epilepsy. He noticed from the drug at first an apparent transient improvement in some cases, though in others the number and severity of the attacks was increased from the beginning. A marked tendency to the development of status epilepticus manifested itself in 3 cases, and 3 others sank into a state of coma, with subnormal temperature and slow, heavy respiration, from the drug. The mental condition of patients under this treatment did not improve at all, even in

those which appeared at first to be benefited in the number of attacks.

Operative Treatment.—M. F. Porter⁹ reports a case of epilepsy and hemiplegia operated upon by trephining as an exploratory measure. Nothing to explain the epilepsy or hemiplegia was found, but the symptoms were markedly improved as a result of the operation, the boy being now able to walk and the convulsions much lessened in number and severity. Two other cases are reported by Keen, to which reference has been made in another part of this article, both of which so far have proved successful. (For further reports on surgical treatment, see vol. iii, A-18.)

State Care of Pauper Epileptics.—Peterson²⁴² has drafted a bill, which was introduced into the Senate of the State of New York in January, 1891, providing for the care of indigent epileptics at the expense of the State. The bill will probably become a law, accomplishing much good for this large class of unfortunates. Bullard⁹⁹ is agitating the same subject in Massachusetts, while J. M. Taylor¹¹² writes upon a kindred subject before the Philadelphia Neurological Society. Papers upon the general subject of treatment in epilepsy were published during the year by Ferguson⁸⁰ (bearing especially upon dietetics), Tureaud,¹⁸⁶ Zenner,²⁴² Stewart,²⁸² Drayton,¹ and Diller.¹¹²

MULTIPLE CEREBRO-SPINAL SCLEROSIS.

Etiology.—A. Nolda²¹⁴ reiterates the belief expressed by Unger, Moncorvo, and others, that disseminated sclerosis stands in a close etiological relation to the infectious diseases of childhood, particularly scarlet fever, measles, and diphtheria. He emphasizes the fact that the older teaching—that the disease is essentially of adult life—is being refuted by an increasingly large number of cases reported as developing in childhood. As corollary to this doctrine of etiological relationship, he urges the exercise of greater care in the convalescent stages of these diseases, though it would seem to us that much greater care and attention should be observed in the stages of primary infection, the object being to modify or lessen, if possible, the intensity of infection and consequent action of the bacteria. It is an open question whether the convulsive seizures, so frequent in these diseases, are not related as causes of the subsequent sclerosis, rather than a

specific action of the bacteria upon the central nervous structure. G. Cousot⁵² agrees with the now generally accepted belief that there is a causative relationship between infectious diseases and multiple sclerosis, citing a case which followed typhus fever. He considers heredity a very constant factor. One of the cases cited by Cousot, showing neither tremor nor contracture, and presenting evidences of syphilitic disease, is open to criticism as to the accuracy of diagnosis, exclusion of diffuse cerebro-spinal syphilis not having been positively established.

Charcot⁷³ describes several abortive and atypical forms, which he divides as follows: 1. Atypical forms which are abortive, owing to the disappearance of the symptoms. These usually are clinical examples of spasmodic paraplegia. 2. Atypical abortive forms owing to early arrest of development of disease, which are also usually of the nature of spasmodic paraplegia. 3. Forms atypical or abortive on account of the supervention of anomalous or unusual symptoms. He makes three subdivisions: (a) the hemiplegic, the paralysis being either transitory or permanent; (b) the tabetic variety; (c) the lateral amyotrophic type, the cells of the anterior horns being involved, with resulting atrophy. The diagnosis of these various forms of the disease can only be made by a close and careful consideration of the history, existing conditions, and continued progress of the cases. Ophthalmoscopic lesions he had found in 55 per cent. of his cases. Zimmerman²⁴⁹ considers optic-nerve atrophy and primary spastic paraplegia, when associated, to be the most valuable diagnostic signs of the disease. Victor Cohen⁶⁹ describes a case diagnosed as multiple sclerosis in which there was a marked symptomatic resemblance to paralysis agitans. A further peculiarity existed in the presence of an intention tremor in the facial muscles. As to the possibility of an association of the two diseases in the same patient, Cohen found only 1 such case reported in medical literature. Westphal³⁰⁹ reports 2 additional cases of the disease occurring in young children.

Arce Penalva⁴¹ relates the case of a boy aged 4 years, presenting symptoms of multiple sclerosis, treated by a modification of the suspension apparatus used in tabes. The modification consisted in the addition of a weight to each limb, which, he claimed, hastened and increased the beneficial effects of suspension. In view of the dangers of suspension, to which attention has been so

often called, the modification suggested, in that it apparently would increase such danger, should be adopted with extreme care, if at all.

CEREBRAL SYPHILIS.

Tarnowski¹¹³ reaches the following conclusions: (1) the patient's history and the results of experimental treatment furnish no basis for a scientific clinical diagnosis of cerebral syphilis; (2) the diagnosis of cerebral syphilis must be based on the study of the nervous symptoms, their development, course, and grouping; (3) unless other organic and mental diseases are excluded an accurate diagnosis is not possible; (4) locomotor ataxia and progressive paralysis are never caused by syphilis; (5) mercurial treatment is to be condemned, even if a history of syphilis is elicited, in these cases; (6) alcohol and heredity are the main factors predisposing to the localization of syphilis in the brain. Conclusions Nos. 4 and 5, it will be noticed, are absolutely revolutionary; and, it may be stated with even more emphasis, are not at all in accordance with the facts of innumerable pathological and clinical studies.

Sachs¹ contributes a paper upon syphilis of the central nervous system. Lancereaux³⁸⁰ writes upon syphilitic encephalitis. E. D. Fisher²⁴² gives an analytical review of the symptomatology.

Hereditary Syphilis.—A writer⁴³³ reports several cases of syphilitic pseudo-paralysis, or Parrot's disease, in which a complete recovery occurred. This is in refutation of the inevitably fatal prognosis announced by Parrot as characteristic in his original description of the disease. This writer also quotes Fournier as having reported several cures. Parrot's disease, he remarks, may be confounded in diagnosis with fracture of radius, osteomyelitis, epiphyseal reparation, and anterior poliomyelitis, and the diagnosis is at times difficult. Treatment must be long-continued, and involves the strictest hygiene. Mercurial inunctions and baths, Van Swieten's liquid, and Gibert's syrup are indicated.

Leon D'Astros, of Marseilles,¹¹⁸ describes some cases in which there was a history of syphilis and hydrocephalus, and, while at the autopsy gummatous nodules, properly speaking, could not be demonstrated in the brain, yet the abundant embryonic infiltration, with rapid diffusion, approached closely that seen in other syphilitic organs.

Charcot and Souques¹⁴ reported a case of retarded cerebral

syphilis of hereditary origin. A writer¹²² discusses the differential diagnosis of different types of meningitis occurring under 3 years of age, with special reference to the points of diagnosis in hereditary syphilitic meningitis. Clinical papers, with reports of cases, are contributed by Jonathan Hutchinson, ² Mar. 21 Page, ⁶ Aug. 20 Jamin and Duboys de Lavigerie.⁴⁷⁹ The latter report a case of specific hemiplegia occurring three years after primary infection, the patient having been continually under treatment, and having taken within that time 20 grammes (5½ drachms) of mercury. Pershing, ⁴⁰ W. H. Carothers, ¹⁰⁵ Dec. 20 Joffroy and Letienne, ³ May 20 and Finlay²⁸² describe cases, the last mentioned being one of syphilitic hemiplegia, developing sixteen months after the primary lesion. The same patient had suffered from a syphilitic myelitis only eight months after the chancre appeared. Audry²¹¹ also reported a case of precocious syphilitic hemiplegia. W. Hale White⁵ advocates subcutaneous injections of perchloride of mercury. Mader, of Vienna, considers energetic inunctions of mercury as affording the surest and quickest means of relief. Bauke⁸⁴ also writes on treatment.

ALLOCHIRIA.

Weiss⁸⁸ reports a case of what might be designated ataxia of common sensation,—a condition to which Obersteiner has applied the term “allochiria,”—exhibiting itself clinically in the patient as a disturbance of sensibility, usually tactile, by which the impression is attributed to the opposite side from that upon which the irritation actually exists. It is most often seen in tabes dorsalis with hysteria. In Weiss's case there was allochiria of tactile pain, muscular and temperature impressions. The patient, a woman, suffered from tabes.

LEAD ENCEPHALOPATHY.

Trimborne³¹⁹ reports 5 cases,—3 recovering and 2 with autopsies. The first case was of the convulsive type, and presented also drop-wrist. There was only one attack of convulsions, the patient subsequently making a good recovery. The second case resembled clinically one of tubercular meningitis, and proved fatal. At the autopsy no lead was found in the brain, which was, however, intensely anæmic. The third case was one of coma without convulsions. The coma was succeeded by profound mental depression, with one interruption of hallu-

cinatory delirium. The patient recovered. The fourth case was of the convulsive type, and proved fatal. The fifth case was one of mixed coma and convulsions, with periods of delirium with hallucinations. An intermission of six weeks was followed by a return of the convulsions and coma, after which recovery gradually occurred. Trimborne believes that the cerebral symptoms in those cases showing no lead in the brain at the autopsy are due to secondary toxic action upon the blood, similar to uræmia, but not necessarily involving albuminuria. Eichhorst⁸¹⁹ contributes a pathological study of the muscles and nerves, with a *résumé* of the cerebral lesions observed in encephalopathia saturniina. One case is reported, with autopsy, of double extensor paralysis, showing cerebral oedema, chronic leptomeningitis of the brain and cord, with advanced changes in the radial nerves, involving the white substance of Schwann and destroying the axis-cylinder and medullary sheath. S. G. Webber⁸²⁰ gives the detailed histories of 5 cases of mild lead poisoning, with cerebral symptoms. The paper is worthy of special mention in that it illustrates the value of the urinary test for lead by iodide of potassium, the diagnosis in several of his cases having been impossible except for the evidence of lead in the urine.

DISEASES OF THE SPINAL CORD.

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NEOPLASMS.

Borgherini, of Padua, ⁵⁷ ~~June 28~~ reports a case of osteosarcoma of the vertebra with secondary lesions of the cord; a case of echinococcus, extra-dural, with secondary irritative and paralytic phenomena; and a solitary tubercular growth in the lumbar enlargement. The article also contains a review of the literature upon this subject and a summary of the symptomatology, in which special attention is called to the slowly progressive character of the motor and sensory symptoms.

MENINGO-MYELITIS.

Mackay ⁶ reports a case of cervical meningo-myelitis following influenza. A female, aged 38, had influenza, in July, 1890. This was accompanied by intense neuralgic pains in the back of the neck from the seventh cervical vertebra to the vertex, radiating toward the shoulders. After it had continued a fortnight, gradual loss of power occurred in the right hand. A few days later the right arm became weak; then, after a few days, she lost power in both legs. There were no sensory symptoms at this stage. In September the examination showed a feeble grasp, particularly in the left hand, feeble power in the legs, uniform wasting of the hands and arms on both sides, less marked wasting in the legs, diminished galvanic and faradic irritability in the arms (and, to a less degree, in the legs); no rigidity; no spasm; ankle-clonus on both sides; knee-jerk exaggerated; plantar reflex increased; gluteal, abdominal, epigastric, and scapular reflexes not elicited; bladder and rectum normal; co-ordination and muscular sense apparently normal. Pain in the region mentioned; no girdle pain; numbness in finger-tips; tingling in calves of legs. Tactile sensibility normal, except at finger-tips. Scattered patches of hyper-

æsthesia on the upper and outer surfaces of arms and flexor surfaces of thighs; also analgesia of finger-tips and parts of the palmar surfaces. Patient was then four months pregnant. She improved respecting the pains and paresis of the arms; then, after obstinate "morning sickness," she became weaker, the pains returned, and paralysis of the respiratory muscles occurred, causing death in November. At the autopsy, twenty hours after death, only the cervical portion of the spine was allowed to be removed. The dura was injected, thickened, and opaque. No traces of tubercle or of caries were found in the membranes or vertebræ. On the anterior aspect the dura was firmly adherent to the vertebral bodies from the level of the sixth cervical upward. On the posterior aspect, the dura, from the fourth cervical body upward, was slightly adherent by a fibrinous exudation. This exudation formed a tough layer one-sixth of an inch thick, at the level of the second and third vertebræ, also adherent to the cord. At the atlanto-axial articulation it was nearly half an inch in thickness, and the cord at this point was completely disintegrated by softening. Lower levels of the cord were also softened. There was considerably more atrophy of all the left nerve-trunks than of those of the right side. It was impossible to properly harden the cord for good section, but teased and compressed osmic-acid preparations revealed the usual constituents of myelitic *débris*.

Polozoff⁵⁷¹ reports, as a case of meningo-myelitis of gonorrhœal origin, the history of a soldier, who, six weeks after an acute urethritis, was attacked with constipation and retention of urine, followed by pain and weakness of the lower extremities. On examination, paresis of the lower extremities was found, the gait being tremulous and difficult. The lower lumbar vertebræ were tender to pressure, and there was complete anæsthesia of both lower extremities, which were also the seat of paræsthesia and lancinating pains. The reflexes were exaggerated, the temperature normal. Twelve days later, he had fever, increased pain in the legs and loins, hyperæsthesia of the skin of the lower extremities and abdomen, sensation of a constriction-band at the level of the lumbar vertebræ. Later, diarrhœa replaced the constipation, tonic spasms occurred in the muscles of the thighs and legs, and, two months later, there was atrophy of the muscles of the lower extremities. At the time the case was reported he was still

paretic. The author is unable to find any other etiological factor than the gonorrhœa. There were no arthritic manifestations of gonorrhœa in this case.

MYELITIS.

Oppenheim,⁶⁸ in a paper on myelitis, expresses the opinion that (1) our knowledge of this disease is still shrouded in obscurity, and, in respect to definition and diagnosis, greater uncertainty and confusion exists than prevail in most of the remaining divisions of diseases of the cord; (2) primary myelitis is, on the whole, a rare disease; (3) there is a disseminated and a diffuse form of myelitis, which often shows a tendency toward cerebral complications, change in the cranial nerves, and, more rarely, in the peripheral nerves; (4) in the etiology of myelitis, infectious processes play the most important rôle; (5) the prognosis is more favorable, according to this sharper differentiation,—that is to say, after the exclusion of disseminated sclerosis and combined sclerosis. These conclusions were reached after an analysis of the material which he had observed, during eight years, at the Charité, in Berlin. Only 3 autopsies revealed lesions that could be regarded as those of primary myelitis. The larger number diagnosed as primary myelitis were cases of compression myelitis. A smaller group belonged to myelitis secondary to syphilitic meningitis; some were cases of multiple sclerosis, and others of combined sclerosis; many of the cases classed as chronic myelitis were cases of disseminated sclerosis. Some cases diagnosed as myelitis ended in complete recovery; 1 case developed upon a malarial basis, another was complicated by neuritis. Diffuse myelitis from tuberculosis and from carcinoma were observed. Disseminated myelitis occurs in the course of such infectious diseases as variola, typhoid fever, scarlet fever, erysipelas, gonorrhœa, puerperal fever, malaria; also, in syphilis, tuberculosis, and malignant neoplasms.

The following is a Society report of C. A. Herter's¹ important paper, entitled "Clinical and Pathological Observations on Injuries of the Cervical Spinal Cord": The histories of 5 cases of injury to the spinal cord were detailed. The first 4 were all examples of severe crushing; the fifth was an instance of injury to the cervical vertebræ, with relatively slight damage to the nervous structures in this region. Among the most interesting features of these particular cases were their bearings upon the

localization of the functions of the cervical cord. In Case I there was an upward extension of the motor paralysis from the interossei and flexors of the fingers to the extensors of the fingers and wrists, the pronators and supinators, and the tricipites, bicipites, and deltoids, successively. In Case II the order of advance was much the same. In both cases the anæsthesia occupied the body and legs, below a V-shaped line across the upper part of the chest, and the inner half of the arms, forearms, and hands. While the motor symptoms progressed upward in both cases, the area of anæsthesia made no advance. When the patients were first seen, they presented essentially the same motor and sensory phenomena, namely, weakness of the hand-muscles and the distinctive anæsthesia above mentioned. The cord-lesion was the same in both cases, *i.e.*, complete crushing at the eighth segment, and partial softening of the seventh and sixth segments. There was no doubt that the peculiar distribution of the anæsthesia was due to the crushing of the eighth segment. In both cases the bone-lesion was a fracture-dislocation of the sixth upon the seventh cervical vertebra. In 3 of the 4 cases there was pressure of the displaced or fractured vertebrae upon the cord at the time of the operation or autopsy. In all total transverse lesions of the cord, and especially in those of the cervical and lumbar enlargements, certain symptoms were referable to the damage of the cord as a central organ, as opposed to those symptoms which depended on the obliteration of the functions of the cord as a conductor of impulses. These symptoms in the cervical region included loss of power and cutaneous sensibility, muscular atrophy, and degenerative electrical reactions. In 2 of the cases (IV and V) there were abdominal symptoms worthy of note. In each case, on the day after admission, the abdomen became tympanitic and exceedingly tender to pressure, and repeated vomiting occurred, the vomitus having at one time a greenish color. The abdominal distension became very great, but began to subside, together with the pain and tenderness and vomiting, in the course of a few days. The temperature, in cases of injury to the cervical cord, varied much, according to the severity of the damage. The last feature of these cases to which it was desired to call attention was the state of the reflexes, especially that of the knee-jerk. The superficial reflexes—cremasteric, plantar, and abdominal—were commonly lost from the

beginning, in cases of complete crushing of the cord, but a day or two sometimes passed before they were all lost. If the patients survived for several days or a week, some or all of the superficial reflexes returned. In all 4 of the cases of complete crushing of the cervical cord, the knee-jerks were abolished from a very early period after the accidents which caused these crushings, respectively. The motor and sensory paralyses below the level of the lesion were complete, and in all the termination was fatal. It might safely be concluded that when bilateral loss of the knee-jerks followed immediately upon a sudden lesion of the cervical cord, we had to deal with a case of extensive and total transverse damage to the cord, and that the patient would die from it. It was not urged, of course, that this diagnostic and prognostic sign should be used to the exclusion of other associated conditions. These considerations led to one important practical conclusion, namely, that patients with crushing of the cord, presenting complete or considerable paralysis of motion and sensation below the lesion, and associated with loss of knee-jerks, should not be operated upon.

Acute Spinal Paralysis.—Sinkler⁹ reports, as a case of "acute spinal paralysis," the history of a young man, 18 years of age, who, after exposure to a great change in temperature, became chilled, and on the following day complained of fever, general weakness and some numbness, a tottering walk, and slight pain in the head. On the next day he was too weak to walk, and began to lose power in the arms. Six days later, at the time of Sinkler's examination, the vision was good, he could turn the head to either side and extend but not flex it; the upper extremities were almost completely paralyzed, also the muscles of the trunk and the lower extremities were completely paralyzed, except slight retention of power in the toes. The knee-jerks were abolished, also the plantar and abdominal reflexes, the cremasteric and epigastric reflexes being preserved. Sensation was unimpaired in the upper and lower extremities, except slight tactile anæsthesia on the fingers and feet; the pain-sense was unaffected. There was slight tingling and numbness in the hands and feet, but no pain or tenderness over muscles or nerve-trunks. The muscles responded to a slowly-interrupted faradic current, the thigh-muscles less readily than others. The speech was unaffected. He died, twelve days after

the outset, of respiratory paralysis. The autopsy (reported by Burr) revealed the lesions of acute transverse myelitis, involving the cervical enlargement, namely: marked infiltration of the entire transverse section by small, round, sometimes irregularly-shaped, cells, which stained deeply, varying in number at different levels, the pia and nerve-roots being involved by the infiltration. In the centre of the anterior gray matter on one side, and posteriorly on the other, were small areas of haemorrhage and softening. There was some engorgement of the capillaries. A few motor cells were shrunken and without processes, but most of them were normal in every respect. Here and there nerve-fibres had disappeared. The vertical extent of the lesion was about an inch. Other portions of the cord, the medulla, pons, brain, and sciatic nerves showed nothing pathological. Sinkler remarks that, from a study of the clinical features, the diagnosis lies between acute multiple neuritis, acute myelitis, Landry's paralysis, and poliomyelitis anterior. Multiple neuritis he excludes, because of the absence of pain in the nerve-trunks, the absence of hyperæsthesia, the fact that sensibility was so little disturbed, the early loss of the reflexes, and the rapid course of the disease. Acute myelitis, he says, is accompanied with early loss of power in the sphincters, exaggerated reflexes if the disease is above the lumbar enlargement, pain in the back, contraction of the limbs, and trophic changes in the skin. The symptomatology of Landry's paralysis closely resembles that of the patient, except that in the typical form of acute ascending paralysis the loss of power begins in the lower extremities and spreads systematically upward, while in the case reported it began in the legs, but spread almost simultaneously to the entire body. He is inclined to believe that the conditions found in the cord were due to the early stage of the disease, and that if the patient had lived to a later period there would have been less evidence of myelitis and more degenerative changes in the anterior horns, similar to the later changes found in anterior poliomyelitis.

COMPRESSION OF THE CORD.

Babinski,⁴⁵⁷ in an article on atonic or flaccid paraplegia from compression of the spinal cord, describes at length facts and theories concerning the tendon reflexes, and seeks to define the con-

ditions which produce their exaggeration or abolition in different pathological states. Abolition of the knee-jerks occurs if that part of the cord is compressed or destroyed upon which the integrity of the reflex depends as its centre or reflex arc. The theory that a lesion involving the entire transverse area of the cord gives rise to exaggerated reflexes below has been denied (Bastian and Bowlby), and the view substituted that, if an upper segment of the cord be entirely destroyed, the knee-jerks will be abolished, but, if partially destroyed, they will be increased. The reflexes are abolished, even with sclerosis of the lateral columns, if there is a lesion of the anterior horns or of the postero-external columns of the lumbar region. The author concludes that flaccid paraplegia occurs when the pressure is upon the lumbo-dorsal portion of the cord, at the level of the centres for the knee-reflex. When the lesion is in the cervical or dorsal region, flaccid paraplegia may occur at the beginning, or when the cord is destroyed in its entire diameter, or if the reflex arc is destroyed. Otherwise, spastic paraplegia results. Compression of the cord may cause a complete or long-continued paraplegia without producing appreciable changes in the structure of the cord; so that, in compression, paraplegia continues for some weeks. If the flaccidity cannot be referred to interruption of the reflex arcs or to destruction of an entire transverse section of the cord, the conclusion is justifiable that the cord has not been greatly altered, and the prognosis, aside from other influences, is favorable, surgical interference being indicated in this class of cases.

Lépine²¹¹ reports a case in which the diagnosis of compression of the cord and nerve-roots was made from the symptoms, among which were atrophy and painful anaesthesia of an arm. The autopsy revealed pachymeningitis, with but little flattening of the cord. He explains the fact by assuming that congestion of the living tissues augmented their volume, causing, during life, a considerable degree of compression.

ANTERIOR POLIOMYELITIS.

Medin, of Stockholm,²¹² gives an account of an epidemic of infantile spinal paralysis, in which 44 cases were observed within a period of five months. In the febrile stages there were somnolence, dyspepsia, occasional vomiting, diarrhoea in some cases, consti-

pation in others. Facial monoplegia was observed in 3 cases, and facial paralysis with polyneuritis and poliomyelitis in 5; abducens paralysis in 5,—twice with poliomyelitis, once with polyneuritis, once with polio-encephalitis, and once in a fatal case. All the nuclei in the pons and medulla corresponding morphologically and physiologically to the cells of the anterior horns of the cord were at times affected. Heubner regarded it as an infectious disease, and Henoch called attention to the presence of so many cerebral symptoms. Hoffmann¹⁰⁰⁵ _{8.12.1916} reports the case of a child, aged 8 years, who developed an extensive paralysis of the upper and lower extremities, beginning as a subacute affection, without fever or pain. There were trophic changes of the muscles, reaction of partial degeneration, no tenderness of the muscles or nerves on pressure, and preservation of the knee-jerks. The muscles supplied by the anterior crural nerve were quite normal on both sides. Complete recovery followed. He made the diagnosis of poliomyelitis, excluding neuritis, on account of the absence of fever, pain, paresthesia, tenderness of nerves, and objective sensory disturbances. Bruns,¹⁸ in reviewing the case, maintains that, notwithstanding the absence of these symptoms, neuritis is not absolutely excluded. The symmetry of the paralysis, the fact that acute anterior poliomyelitis rarely occurs without leaving *residua* in the form of more or less permanent atrophy, and that neuritis may be limited to motor fibres, suggest that the case may have been one of polyneuritis, and not of poliomyelitis.

Nonne¹⁰⁰⁶ _{8.12.1916} reports a case of chronic anterior poliomyelitis, in a woman aged 36 years, beginning with a paresis of the muscles of the left shoulder and arm, later involving the right arm, and soon after the legs. Paralysis and atrophy of certain muscular groups developed, not representing any special type, but showing the reaction of degeneration. The paralysis gradually progressed, until even the bulbar and cranial nerves were in some degree affected. The knee-jerks gradually disappeared. There were no objective sensory disturbances, but, toward the last, lancinating pains were felt in the arms and legs. Death occurred, after two years, from pneumonia. The autopsy revealed decided changes in the anterior horns and columns, most pronounced in the cervical and lumbar enlargements, the ganglion-cells being greatly reduced in number. The anterior roots and peripheral nerves showed

descending degeneration, which the author regards as secondary. The white substance being not wholly without change, the posterior and lateral columns showed a certain reduction of fibres, as also observed in a case of Oppenheim's and one of Dreschfeld's. There was degenerative atrophy of the affected muscles. The author distinguishes the case from progressive muscular atrophy by the absence of the Aran-Duchenne type of localization, and the fact that the paralysis and atrophy ran a parallel course in the disease, while in poliomyelitis paralysis occurs first, and atrophy later, as in the case reported. He recognizes three forms of chronic anterior poliomyelitis: 1. A circumscribed form, which seems to remain stationary at a certain period of its development. 2. A form in which a large number of muscles become rapidly involved, with a subsequent tendency toward recovery. 3. A form whose evolution is slowly progressive; an expression of a primary atrophy of the ganglion-cells, with or without secondary atrophy of the peripheral nerves. His own case belongs to the latter class. Gibney⁹ ₁₀ reports 6 cases, illustrative of what he terms "supplemental treatment of the paralysis of acute anterior poliomyelitis." He advocates the correction of deformity from atrophy and contractions, the removal of tension from a weakened muscle, the replacement of the joint surfaces in normal apposition, and the assistance generally given to a limb the muscles of which are weak and palsied. He accomplishes this by means of tenotomy and mechanical supports.

Lesions of the Cauda Equina.—A case of disease of the conus medullaris and the cauda equina in a woman, non-traumatic, is reported by Eulenburg.¹¹⁴ It did not come to an autopsy, but improved. Bechterew⁷⁵ has also made the same diagnosis in a case. Herter's carefully reported case and one by Laquer are worthy of careful consideration.

HÆMATOMYELIA.

In an interesting clinical lecture, Sharkey⁶ reports "a case of primary hæmorrhage into the spinal cord," with an autopsy. A boy aged 13 fell while skating; he walked home, apparently unhurt, but almost immediately after reaching the house felt pain in the left shoulder, abdomen, and legs; after two hours he was unable to walk, and was put to bed. On admission to the hospital, two days later, he still complained of pain in the abdomen and legs,

had a pulse of 144, temperature of 101.8° F. (38.8° C.), retention of urine, complete paralysis of the legs, with impairment of sensation upward as far as the fourth or fifth dorsal spine. The upper limit of the anæsthesia on the right passed from this point, sloping forward in the direction of the ribs, and reaching the level of the sixth rib in front; on the left it reached the level of the fifth. A small zone of hyperæsthesia was present just above the line of anæsthesia. There was some numbness in the left hand. The knee-jerk was absent on the right; present, but diminished, on the left. There was no ankle-clonus. The abdominal and cremasteric reflexes were absent; plantar fairly brisk. The pupils were small, and did not react to light; there was no optic neuritis. He died from pneumonia eight days after the fall. No injury to back, the spine, or its membranes was found at the autopsy. The cerebral surface was much congested; the medulla normal. The membranes of the cord were congested, but free from lymph. At a level of the third dorsal pair of nerves a hard localized swelling was felt, and the cord was bulged. On making a section through it, an extravasation of blood was found, occupying nearly all the transverse extent of the cord; a little of the white and gray matter could be made out on the right side. Above the hæmorrhage as far as the upper cervical region, and below as far as the mid-dorsal region, the anterior and posterior cornua were converted into a cavity containing black, liquid blood. The lumbar and sacral regions were normal. The lungs presented the red stage of a bronchopneumonia. Microscopic examination showed that the hæmorrhage was the only pathological condition present in the cord, there being no sign of inflammation or other disease. During life the diagnosis of acute myelitis was favored, as it was thought that the development of the symptom was not quite sudden enough for it to have been a hæmorrhage; the presence of fever was also misleading, as it does not usually occur in hæmorrhage of the cord. It is accounted for by the pneumonia, which the author regards as depending, probably, directly upon the nerve-lesion. The location of the lesion accounts for most of the symptoms quite satisfactorily. The absence of knee-jerk on the completely destroyed half-segment, and its slight preservation on the other when normal tissue remained, is interesting in view of Bastian's theory that complete transverse destructive lesions high up in the cord abolish the knee-jerk.

Ellis⁶ reports, briefly, the case of a submarine diver, who, after a too sudden ascent (one hundred and twenty feet in a minute and a half), complained of pain in the stomach and numbness of the legs, after removing his helmet; an hour later, was paraplegic, with impairment of sensation, which gradually increased and extended upward, death occurring on the sixth day. The diagnosis, says the writer, was haemorrhage into the spinal membranes, and it was confirmed by the autopsy, no details of which are given. His article, however, is entitled "Primary Haemorrhage into the Spinal Cord." The atmospheric pressure at one hundred and twenty feet he gives at over 52 pounds to the square inch, showing the enormous variation in pressure on the vascular system experienced in a minute and a half.

Boinet⁸ describes the case of a man, who, two hours after a prolonged sea-bath, developed painful sensations in the feet and loss of sensibility in the subumbilical region. During the following night paralysis of legs occurred, and extended to the thighs the next day,—without spastic conditions, with abolished knee-jerks, but without sensory impairment. The next day the upper extremities became paralyzed, without loss of sensation; disturbances of speech and deglutition followed; incontinence of urine and faeces occurred, and, finally, paralysis of the diaphragm and other respiratory muscles, producing death four days after the first symptoms. The autopsy revealed marked congestion of the meninges of the brain and cord; a haemorrhagic focus, 26 millimetres in length by 5 in width, on the surface of the meninges, and corresponding to a clot, 10 millimetres long, 5 millimetres wide, and 8 millimetres deep, in the right half of the inferior portion of the cervical enlargement; a haemorrhagic extravasation, 3 centimetres in length, encroaching on the sixth and seventh cervical pairs of nerves, and, limited to the superficial layers of the cord, another haemorrhagic focus, 12 millimetres long and 4 millimetres wide, at a level with the seventh cervical. The other organs were normal.

Cases diagnosed as spinal haemorrhage, from the rapid onset and development of the symptoms, but not substantiated by post-mortem verification, are reported by Diller, ⁵⁰ Sleman, ⁶ Nichols, ² and Hoch ⁸⁸ (2 cases). In Nichols's case the man had dived into shallow water and hit his head on sand; was conscious, but became at once paralyzed in the arms and legs; had extreme

hyperæsthesia of the arms, diaphragmatic breathing, contracted pupils, and abolished reflexes. Improvement occurred rapidly, but complete recovery did not take place. It was regarded as a lesion of the lower part of the cervical enlargement, probably hæmorrhagic. Hoch, in his paper on hæmatomyelia, refers to the view favored by Charcot and by Hayem, that softening of the cord must always precede the hæmorrhage, as opposed to those who admit the possibility of a primary hæmorrhage of the cord, and mentions the expressions of Leyden and Eichhorst, to the effect that we may be unable, even with a microscopical examination, to settle the question, whether we have to deal with a primary softening and a secondary hæmorrhage, or with a primary hæmorrhage and a secondary softening. Hoch's first patient was struck between his shoulders by a board falling from the height of eight to ten feet, without producing any immediate effects, save some soreness next day, which soon passed off and left him quite well. Three weeks later he was suddenly seized with acute pain between the shoulders, radiating down the spine and into the arms, followed by a contracture, of short duration, in the arms, and, within eight to ten minutes, by complete sensory and motor paralysis from the arms down (with the exception of the higher-situated muscles of the arms); there was retention of the urine and faeces. Improvement occurred in the left leg the following day,—comparatively rapid improvement,—also in the right leg and left arm, so that after three weeks there remained only paralysis of the right arm, especially the forearm.

On examination a month after, no sensory changes were evident, but paralysis with atrophy, showing characteristic electrical changes of certain muscles of the right arm. His second patient fell from a train, sustained several injuries, but no perceptible one of the spine. There was no trace of paralysis for six days; at that time he developed pain in the right extremities, and, after some hours' sleep, paralysis in the right leg and arm. On examination three months after, weakness of triceps, pectoralis, flexors and extensors, and small muscles of the hand of the right side were found, with decrease in electrical excitability in some of these muscles, also some atrophy; no atrophy or electrical changes in the muscles of the leg, but slight stiffness in the right leg and loss of temperature sense and pain on the entire non-paralyzed left side.

He regards it as a case of Brown-Séquard paralysis, resembling the picture of syringomyelia, but due, he thinks, to hæmatomyelia.

The relatively long interval in both cases, between the time of the accidents and the appearance of the first symptoms, suggests to me that a process of myelitic softening, beginning in the region about the central canal, from which appreciable symptoms might not develop at first, may have furnished the conditions for a subsequent hæmorrhage.

SYRINGOMYELIA.

The cases diagnosticated as syringomyelia continue to increase, but those in which the diagnosis has been verified by an autopsy are still very rare. On the other hand, syringomyelia continues to be found on autopsy in cases where other lesions were suspected, showing that in many cases it is impossible to recognize this disease from the symptoms during life, and that the chief reliance—partial sensory impairment (loss of pain and temperature sense)—is not always evident. In this connection, Déjerine and Thuilant's case⁸¹ is of special interest, the only sensory disturbance being loss of the temperature sense to heat, but not to cold. The summary of the case is as follows: Spasmodic paraplegia and atrophy of the muscles of the right hand and forearm in a male aged 34; slowly progressive fulgurating pains in the lower extremities; cicatrices from burns on both hands; hyperostosis of the left olecranon; diminution of galvanic and faradic contractility, without reaction of degeneration; perfect preservation of tactile and pain sense over the entire cutaneous surface; preservation of sensibility to all temperature above 20° C. (68° F.) over the entire body; extreme perversion to temperature below 20° C. (68° F.) on the skin of the upper extremities and the trunk. In these regions the patient could be burnt without being aware of it. In all other regions of the body sensibility to heat preserved. Death occurred from pulmonary phthisis. Autopsy: Glioma, with a large cavity, occupying the entire length of the cord; some cutaneous neuritis of the skin of the forearm; marked neuritis of the motor nerves corresponding to the atrophied muscles. The authors call attention to the importance of careful testing of the temperature sense in all its phases. Had they been content to test their patient with low temperatures only, they would have pronounced him normal as regards sensibility, and made an error in diagnosis.

Bitot and Lamacq¹⁸⁸, report the case of a female, aged 62, who presented a right hemiatrophy of the tongue and a hemiparesis of the corresponding side. The skin of the right hand showed traces of cellulitis. Sensibility was, at this time, entirely normal. Three months later the paresis had increased, contractures were present, and the pain and temperature sense was impaired, suggesting syringomyelia. She died of pulmonary disease. The autopsy revealed a large cavity throughout the cord.

Joffroy³, has been fortunate in obtaining additional evidence favorable to his view that Morvan's disease is but a manifestation of syringomyelia. To his former autopsy on a female who had Morvan's disease, and in which he found syringomyelia, he now adds a second, in which the destruction of the phalanges of the right hand, from cellulitis and necrosis, was very marked. An extensive cavity was found in the cord, reaching from the upper cervical to the lower dorsal region, measuring six to seven millimetres transversely and three millimetres antero-posteriorly.

Hochhaus³²⁸ reports a case in which, for a long time, the patient exhibited weakness of the right arm and a slight muscular atrophy of the right shoulder, when, suddenly, all four extremities became paralyzed. Paresthesia and pain were present to a slight degree, but no other sensory impairment, not even of the partial form. The autopsy revealed a glioma of the cervical region, about the level of the third cervical nerves, with the beginning of a cavity. There was no secondary degeneration.

Joffroy and Achard⁴⁵⁷ describe the case of a woman, aged 30, who had been subject to epileptiform attacks for several years. During the intervals, contractures had occurred, and a chorea of the left arm; later, Basedow's disease developed (exophthalmic goitre, tachycardia, and pulsation of the carotids). Sensibility was normal in all respects. There were no atrophic disorders. She died, after an illness of seven years. The autopsy revealed an intracranial angioma cavernosum. The veins of posterior part of the right hemisphere were greatly dilated, and the angioma involved a portion of the occipital lobe. The veins of the spinal cord were also dilated, and a cavity was found posterior to the central canal, and extending from the medulla oblongata to the commencement of the dorsal region. The cavity was inclosed by a layer of neuroglia with thick fibres, but true gliomatous tissue was

not found. The reporters look upon the cavity as a result of the circulatory disturbances, producing an excavating myelitis (*myélite cavitaire*). It had not given rise to any symptoms.

Galloway² reports the case of a patient who died from general paralysis of the insane. The autopsy showed, besides the usual cerebral lesions of that disease, a cavity in the cord, extending from the upper cervical to the upper lumbar region. In the dorsal region it was most extensive. It was surrounded by a ring of tissue firmer and whiter than the substance of the cord about it, and consisted of the interlacing of fibres of neuroglia-cells. This ring of tissue varied inversely with the size of the cavity, being thinnest where the cavity was largest.

Of the several interesting cases reported in which the diagnosis of syringomyelia was made, or this condition suspected, but not demonstrated by an autopsy, mention may be made of a series of 6 cases reported by Schlesinger,⁸⁴ in a paper on syringomyelia, which thoroughly treats of the entire subject. Seelig-müller³⁴ also reports a case, in illustration of the subject, in a paper on syringomyelia. He calls attention to the frequency of deformities of the spinal column in this disease. Bernhardt,⁴¹ in reporting a case, also calls attention to the frequency of scoliosis, stating that in 20 per cent. of the published cases it is mentioned as present. He regards Morvan's disease as probably identical with syringomyelia. Pribram⁵⁷ reports 3 interesting cases suggestive of syringomyelia. Hoffmann⁸ reports 5 quite typical cases of syringomyelia, or of Morvan's type. He sides with those who regard Morvan's disease as an analogous affection to syringomyelia, if not the same. Jolly⁶⁹ reports a case of Morvan's disease, but expresses the view that a sharp distinction between it and syringomyelia is not possible. Achard, in a clinical lecture on Morvan's disease, reaches the conclusion that it is one of the various clinical forms of syringomyelia. Pitres¹⁸⁸ reports a case as syringomyelia which, five years before, he had diagnosticated as polyneuritis.

Shaw²²² has reported a somewhat doubtful case of syringomyelia still under observation. Robinson, of Constantinople,²⁴ reports an interesting case, in which the patient, almost immediately after a fall from his horse, became paralyzed in one leg and both arms, and had incontinence of urine and faeces. Rapid improve-

ment occurred during the next three months, but not recovery. A year after the accident, Robinson found the typical symptoms of syringomyelia. He advances the view that the case is one of syringomyelia, developing from a haemorrhage into the cord at the time of the accident, though he admits the possibility of the existence of the cavity before the accident. Charcot and Brissaud,⁷³ report a case of syringomyelia which came under their observation in 1875, and again in 1890. Seen by Charcot in 1875, the patient presented a spastic condition of the left leg, with feebleness and lack of co-ordinative power, painful cramps were present in certain muscles, and the knee-jerk was exaggerated. The symptoms began when he was but 10 years old, but the paralysis came on suddenly years after, and was followed by contracture. When seen by Charcot and Brissaud, in 1890, the trouble was still confined to the left side of the body, but, in addition to the motor symptoms, the thermal sense was abolished over the entire left side, including the face, tongue, and pharynx, and the pain sense nearly abolished. The fingers of the left hand were hypertrophied, resembling acromegaly to some extent. They also showed the signs of former attacks of cellulitis. The authors call special attention to the fact that syringomyelia may give rise to nothing more than a simple spastic hemiplegia, lasting for years before other symptoms develop. Ssokolów⁵⁸⁶ reports 3 cases of syringomyelia with joint affections, and, on reviewing the literature of this disease, found 20 others, representing, he says, about 10 per cent. of the published cases. From an analysis of these cases, he reaches the following conclusions: That joint affections are very frequent in gliomatosis (syringomyelia). In contradistinction to the arthropathies of tabes, they affect chiefly the upper extremities. Their development is exceedingly slow, but in advanced stages they take on the characteristics of a deforming arthropathy. As in tabes, they exhibit more or less complete analgesia. The diagnosis rests on the anatomical features and the clinical course. At an early stage immobilization of the joint is the proper treatment; in late stages, operative measures. An exceedingly instructive clinical lecture has been delivered by Charcot⁹⁴ on a case of paralysis from a lesion of the first dorsal nerve-root, with a unilateral lesion of the cord simulating syringomyelia. The patient, sent to La Salpêtrière as a case of syringomyelia, was a young man, aged

28, who had been shot in the back of the neck four years previous. A cicatrix remained, one centimetre from the middle line, at the level of the seventh cervical vertebra. The bullet was never extracted. The immediate effects were paralysis of the right upper and lower extremities. Two months later he had completely recovered. Three years passed, when, one day on lifting a heavy sack, he experienced sudden and severe pain between the shoulders, with a sense of suffocation for ten minutes. The next day slight weakness of the right leg was noticed. Soon the right hand commenced to atrophy. Some weeks later a slight wound revealed to him that the inner side of his right forearm was not sensitive to pain. More recently, he noticed that sensation was perverted in the left lower extremity. In presenting this patient to the class, Charcot first analyzed it from the stand-point of syringomyelia as a diagnosis, and found that, at first sight, it gave a clinical picture consistent with this disease: Paresis and atrophy of the right hand and forearm; partial sensory disturbances on the inner side of the right arm, namely, loss of pain and temperature sense, with preservation of tactile sensibility, so characteristic of syringomyelia; the left upper extremity was normal; the right lower extremity showed spastic paralysis, with exaggerated knee-jerk; also the left lower extremity to a slight degree. The trunk and left lower extremity also exhibited a peculiar dysæsthesia, such as is frequently found in compression of the cord, but not showing partial anaesthesia. He admitted that this condition of the lower extremities is not a feature of syringomyelia. A scoliosis was also made out, and, in addition to this, another symptom sometimes met with in syringomyelia was present, namely, contractions of the right pupil, recession of the eyeball, and narrowing of the palpebral fissure, with some flattening of the face, indicating a lesion of the cilio-spinal centre or its representative nerves. (At this point in the demonstration, the professor informed his class that this apparently satisfactory diagnosis was incorrect.) A more critical examination of the sensory disturbances of the forearm showed that the partial anaesthesia is limited to the cutaneous-nerve distribution from the first dorsal nerve. The partial anaesthesia of syringomyelia was not distributed in this way, but involved circumferential segments of the extremity, as in hysteria and in lepra. The atrophied muscles were also supplied from the first dorsal pair. The sympathetic fibres which

dilate the iris—those supplying Müller's muscle, the paralysis of which determines the recession of the eyeball—accompanied the first dorsal nerve in its exit from the spinal canal. He was of the opinion, therefore, that the ball penetrating the vertebra, slightly injuring the cord and striking the body of the first or second dorsal vertebra, had produced slow inflammatory changes, increasing their fragility, causing them to crush together under the strain of lifting, thereby compressing the first dorsal nerve. The condition of the lower extremities pointed to a unilateral lesion of the cord, producing symptoms of the Brown-Séquard type. An operation was suggested in this case, which was carried out. Marked roughing of the laminæ of the seventh cervical and the first dorsal was found, but, on trephining these laminæ, nothing abnormal was felt or seen in the spinal canal. The patient's condition was not materially altered by the operation.

MYELOPATHIC PROGRESSIVE MUSCULAR ATROPHY.

Knapp⁹⁹ has reported a case of progressive muscular atrophy, which he considers of myelopathic origin. His paper is entitled "Hereditary and Traumatic Motor Tabes." Following Schultze, he uses the term "motor tabes" to include progressive spinal muscular atrophy, amyotrophic lateral sclerosis, and bulbar paralysis. I regard Schultze's use of the term as unfortunate. From its brevity, the term tabes is convenient, as applied to locomotor ataxia, which cannot properly be called sensory tabes, as its symptomatology includes sensory and motor phenomena. With the application of the term to diseases of the posterior columns, to the anterior horns (myelopathic muscular atrophy), to the lateral columns (spasmodic tabes of the French author), it will soon cover the entire list of degenerative diseases of the cord. Its entire disuse has been recommended by some, but its fixed application to the clinical group of symptoms known as locomotor ataxia makes it difficult to abolish, and all the more important that its use be limited to this disease.

The case forming the subject of Knapp's remarks was one of muscular atrophy occurring in a man 34 years of age. The trouble had commenced with fibrillary twitchings in the muscles of the right thigh, followed by weakness and atrophy. There were no sensory disturbances. Faradic excitability was lost and gal-

vanic excitability diminished, and the contractions were slow, but there was no change in formula. The disease progressed steadily, both legs becoming helpless and atrophied. The fibrillary twitchings finally appeared in the muscles of the shoulder and upper arm. There was a history of a kick in the right thigh, not of a very serious character, a few months before the onset of the symptoms. There was also a history of a peculiar affection in the patient's mother's family, of which the mother, and at least four others in preceding generations, had died. The affection was marked by paralysis of all the limbs, and in no case had there been atrophy. All the attacks had come on in middle life. The case reported was regarded as of spinal origin, and it was thought that the family disease was also spinal. In connection with this case, an instance of typical Aran-Duchenne atrophy beginning in the thumb-muscles was reported, where the patient's father had died of a similar trouble. A case of progressive atrophy, with bulbar symptoms, was also cited, dating from a fall on the elbow.

SYPHILITIC DISEASES OF THE CORD.

Williamson⁹⁰ reports a case of syphilitic paraplegia, with an autopsy, in which the patient was attacked, several months after having contracted syphilis, with retention of urine and paraplegia. Improvement occurred in a few days, so that he could walk; but a few weeks later he again suddenly became paraplegic, and remained so for nine years, contractions and incontinence of urine and faeces having gradually developed. There were no sensory disturbances, except slight pain in the back at times; no spinal curvature. He died from suppurative disease of the kidneys and bladder. The pathological changes found in the cord were: (a) Sclerosis of the lateral pyramidal tracts throughout the whole length of the cord. (b) Sclerosis of Goll's columns from about the junction of dorsal and cervical regions up to the highest part of the cervical region. The sclerosed region in Goll's columns is small at first, gradually increasing for a little distance upward, from which point the whole of the column is degenerated, up to the highest cervical region. (c) Sclerosis in the direct cerebellar tract, beginning in the upper dorsal region and extending to the highest cervical region. (d) Sclerosis at the periphery of the cord in the cervical region, extending farther forward than the direct cerebellar tract. (e) The

absence of any except the slightest changes in the posterior external column. (*f*) The absence of any area of transverse myelitis. Williamson says that, with the distinct history of syphilis, there is the greatest probability that the paralytic symptoms were of syphilitic origin. He calls attention to the difference between this case and the usual secondary degenerations, namely, that the direct cerebellar tracts and the columns of Goll are most affected in the cervical region of the cord, and the degeneration gradually diminishes toward the lower part. The degeneration in the pyramidal tract diminishes from below upward, being most marked in the lumbar and dorsal regions, least marked in the cervical; the reverse of what occurs in secondary degeneration following a transverse lesion of the cord. With the exception of the peripheral sclerosis, the localization of the sclerosis resembles that occurring in Strümpell's cases of combined postero-lateral sclerosis.

Thomas⁸⁵⁸ reports the following case of cerebro-spinal syphilis, with an unusual lesion in the spinal cord. Clinical summary: Male, aged 33; no syphilitic history; paralysis of right sixth cranial nerve, accompanied by intense headache, in January, relieved by treatment; in May, headache and paralysis of the left fourth nerve; in November, paralysis of the left third and fourth nerves; weakness of the muscles on the right side of the body, with slight sensory changes; increasing coma; death. Anatomical summary: Syphilitic orchitis; syphilitic endarteritis (gummatous) of cerebral arteries; gumma on left third nerve, involving left crus; gummata on left fourth, right sixth, ninth, and twelfth nerves in the brain; gumma on the anterior roots of third cervical nerves; meningitis of cord; poliomyelitis of lumbar enlargement; hyaline degeneration in the walls of the small arteries. The changes found in the cord are particularly interesting; at the commencement of the lumbar enlargement the anterior gray horns appear diseased; a little lower down hemorrhages are evident in them, and still lower the gray matter seems to have been disintegrated, leaving a cavity. Just below this there is an area in which the gray matter, although evidently diseased, presents no loss of substance. This is again followed by hemorrhages and cavity formations in the anterior horns. Below this second more pronouncedly diseased area the gray matter seems to be normal. The pia throughout the whole length of the cord is infiltrated with small round-cells.

This is most intense about the anterior longitudinal fissure. The infiltration accompanies the vessels as they run into the fissures, and to some extent into the cord. The connective tissue about the nerve-roots is more or less affected. In the anterior horns, through the diseased portion of the lumbar region, the blood-vessels exhibit hyaline degeneration and are often infiltrated with small cells; capillary haemorrhages are seen about them. The neuroglia has become rarefied, staining less deeply than normal, and presenting a finely fibrous appearance, with some branched cells. The large ganglion-cells, when not completely absent, are represented by shrunken and degenerate remains. These changes are limited to certain portions of the horn; not involving it as a whole, but chiefly the central portions. At some levels cavities exist. The author considers the changes in the gray matter as secondary, and dependent on the lesions of the blood-vessels.

Cases diagnosticated as syphilis of the cord, but without autopsies, are reported by Zenner⁵³ (2 cases), Finley²³² (3 cases), Soler y Buscalla¹⁷⁹; and clinical lectures by Kalenderu²⁵⁹ on "Early Syphilitic Myelitis"; Lancereaux, ³ _{Apr. 11} "Syphilitic Medullary Arteritis,"—an interesting summary of the subject; and, by Crocq, ²⁸⁸ _{Nov. 20, 1900} on a case of "Syphilitic Disease of the Cord and Lungs." Moeller's "Studies of Syphilis of the Spinal Cord" ⁸⁷¹ _{v. 22, No. 2; June} ⁸⁶⁶ give an interesting historical review of the literature, an analysis of 24 recorded cases, and reports of 2 cases of his own.

THE COMBINED SCLEROSES.

Putnam,²⁴² in an extensive article, has described "a group of cases of system scleroses of the spinal cord, associated with diffuse collateral degeneration, occurring in enfeebled persons past middle life, and especially in women." Eight fatal cases were observed, in 4 of which an autopsy was obtained, the results of which are carefully described and illustrated. Dana,²⁴² having observed and obtained an autopsy in a case which he regards as belonging to the class of cases described by Putnam, has presented a report of the same, and summarized the facts in his and Putnam's cases, which class he is disposed to look upon as a new type. He gives the following general description of the disease:—

"The patients were, in most cases (7 out of 19), women. The ages ranged from 45 to 64 years. In some there was a neurotic

inheritance, and, in several, lead was found in the urine at times. No distinct history of syphilis could be made out in any instance, nor were the patients alcoholic. The disease ran a rather rapid course, varying from nine months to four years, and averaging two years.

"The symptoms began, generally, with numbness of the extremities, followed by progressive enfeeblement, and ending always in a preterminal paraplegia. Great emaciation and anaemia were present, and there was often an obstinate diarrhoea. No paralysis of any special groups of muscles occurred until the final paraplegia set in. There were, in some cases, anaesthesia and ataxia, but spastic symptoms, with exaggerated knee-jerk and ankle-clonus, were the more common. Lancing or girdle pains were very rarely present. The arms were affected, but less than the legs. The vision and other special senses and speech were not disturbed. Mental symptoms, approaching dementia, were observed in the terminal stages, in some cases. The general course was that of a rather rapidly progressive affection, causing paraesthesia and, sometimes, anaesthesia of the extremities, especially the lower, with progressive weakness of the extremities. This was associated with anaemia, general muscular emaciation, diarrhoea, ending in a paraplegia."

Concerning the pathological appearances, quoting Putnam:—

"In all the cases, two sets of changes in the cord are recognizable,—one of older date, consisting in a relatively dense sclerosis in the posterior columns and in the lateral column (mainly confined to the pyramidal tracts); and one of subacute character, and evidently of quite recent occurrence. This subacute process was, as regards the white column, partly in new tracts, partly around the borders of the more dense sclerosis, and was chiefly characterized by the perforated appearance, now familiar to every pathologist, which actually results, perhaps, from the post-mortem changes induced by hardening, but indicates a somewhat rapid destruction of nerve-tubes with the oedematous distension or destruction of the intervening septa, associated with the formation of granule-cells. In the gray horns, the degenerative change (partly recent, partly of older date) was indicated by a disintegration of nerve-cells. In certain parts of some of the cords, indeed, the almost entire destruction of nerve-cells shows that, in them, the

ganglionic matter, as well as the white columns, had borne its full share of the brunt of the degenerative process.

"The nerve-roots, in certain regions, usually the posterior, lumbar, or sacral, are somewhat involved. The peripheral nerves in the cases examined showed no especial change. The brain and medulla are not affected. The morbid process in the spinal cord is not primarily inflammatory, though some reactive meningitis may occur in the terminal stage. The cases in question do not all resemble each other closely, but they do seem to be much more nearly allied to each other than to any known form of systemic spinal degeneration. Their differentiation as a special group seems measurably justified by the following considerations: Etiologically, it is peculiar, in occurring so often in women, and at a comparatively advanced period of life. Syphilis does not appear often to be a factor in its cause. Symptomologically, it is distinguished by its almost subacute course, by the presence of paresthesia, and often of anaesthesia, with, as a rule, spastic symptoms, and, finally, paraplegia. Pain, also, is not common. Ataxic paraplegia, on the other hand, runs a very chronic course; anaesthesia is quite rare, and paraplegia comes late. Anatomically, it is peculiar, in the fact that the degenerative process is rapid, and accompanied with a peculiar collateral or terminal softening. The lesion is also less diffuse than in ataxic paraplegia, and involves the root-zones of the posterior columns and the posterior columns generally, more than in the allied disease. Its distinction from locomotor ataxia with secondary lateral sclerosis is in every way most marked. It may be said, perhaps, to bear some resemblance to those secondary changes in the cord which occur in general paralysis. But none of the reported cases had this disease, though one was somewhat demented a short time before death."

Putnam also makes the following condensed statements: "We have the following pathological conditions to account for: (1) a relatively chronic sclerosis in the posterior and lateral centripetal and centrifugal long tracts; (2) a more acute and recent degenerative change in adjoining areas, partly diffuse and partly systemic in distribution; (3) a diffuse degeneration of varying severity and uncertain duration in the ganglionic matter of the cord, and probably the intervertebral ganglia; (4) degeneration of moderate degree in the nerve-roots and peripheral nerves. To

sum up, once more, the features that make these cases important, they give us evidence of the occurrence, among persons, especially women of advanced age, constitutional feebleness, or impaired nutrition of somewhat irregular types of 'combined sclerosis' of the cord, often of relatively rapid course and fatal issue, associated with a tendency to subacute diffuse degeneration. Besides the causes indicated above, this condition may be occasionally due, at least in part, to toxic influences of a preventable kind. Finally, in the early stages of some of these cases, it may be impossible to say whether we have to deal with myelitis or multiple neuritis, and, in fact, both conditions are probably often present together."

Grainger Stewart,² reports a case, then living, which, he thinks, resembles Putnam's type.

Clark,¹³¹ in an interesting paper on "Some Varieties of Paraplegia with Lateral Sclerosis," describes the different forms of degenerative disease of the lateral columns, and gives the histories of one or more cases illustrative of each variety.

SCLEROSIS OF THE POSTERIOR COLUMNS.

Etiology of Tabes.—Erb¹⁵ has presented another series of cases illustrating the association of tabes and syphilis. Of 300 cases of tabes, taken from his private practice, 33, or 11 per cent., were without apparent syphilitic infection; 267, or 89 per cent., had had syphilis. More than two-thirds of the latter gave a history of secondary syphilis, the other third having suffered from chancre, but without secondary symptoms. Of the non-infected class, no less than 19 were suspected cases, having shown eruptions, scars at the angles of the mouth, on the tongue, on the penis; had been treated for sore throat, or their wives had aborted or had still-born children. Of the 33 cases, 24 had suffered from gonorrhœa, some several times, and others had stricture. In 9 cases no trace or suspicion of syphilis could be found. In those having a chancre only, many were suspected of a general infection also. In 15 the sore was described as hard. In 31 antisyphilitic treatment was carried out. Classing these cases with his former series, we have 500 cases, of which 10.8 per cent. were not infected and 89.2 per cent. were infected. Of 50 additional cases, from the lower classes, 12, or 24 per cent., did not show evidence of infection, while 38, or 76 per cent., did; 26 of these had secondary

signs; 12 had a chancre only. The time of onset for the majority was from six to fifteen years, 88 per cent. coming on within twenty years. Of 19 cases in women, 9 were certainly syphilitic, 8 probably so, and 2 were without evidence of it. Concerning other possible etiological causes, or combination of causes, his cases are grouped as follows: Syphilis alone, 27 per cent.; syphilis and cold, 11 per cent.; syphilis and fatigue, 6 per cent.; syphilis and sexual excesses, 9.6 per cent.; syphilis and trauma, 1.7 per cent.; syphilis and neuropathic tendencies, 12 per cent.; syphilis, cold, and fatigue, 13.5 per cent.; syphilis, cold, and excesses, 1.7 per cent.; syphilis, fatigue, and excesses, 0.7 per cent.; syphilis, trauma, cold, or excesses, 1 per cent.; neuropathic tendencies alone, 0.7 per cent.; cold alone, 1.4 per cent.; fatigue, 0.3 per cent.; sexual excesses, 1 per cent.; cold and fatigue, 0.7 per cent.; trauma, 0.3 per cent.; several causes, but not syphilitic, 1.4 per cent.; cases without demonstrable cause, but in several of which syphilis was suspected, 5.4 per cent. Gerlach⁶⁴ has investigated the relations of syphilis to tabes and general paralysis of the insane in 156 cases,—115 of general paralysis, 35 of tabes, and 8 of the two diseases combined. Of the tabetic men, 56.25 per cent. had certainly had syphilis; and of the women, 66.7 per cent. In 21.90 per cent. of the men and 33.3 per cent. of the women there was, in all probability, syphilis. Of 103 males, with general paralysis, 50.5 per cent. had certainly had syphilis and 17.5 per cent. had probably had it. Of the females, 16.7 per cent. certainly had syphilis and 58.7 probably had it. He states that with the increasing age of the patient the interval between the infection and the nervous disease becomes less.

Bernhardt⁷⁵ reports a case of tabes in a woman aged 28, without a history of syphilis or hereditary defects, who worked a double-pedal sewing-machine from morning until midnight for several years before her symptoms appeared. He raises the question of its having been a possible etiological factor in the case, and quotes a report by Guelliot¹⁷ of 2 cases of tabes in females who had worked excessively at sewing-machines. Another feature of Bernhardt's case was that the patient was pregnant, and an abortion was induced, on account of the marked increase of the pains in the extremities. It lessened these, but did not improve the case otherwise. At the time of the report she had become pregnant a second

time, and it was decided not to interfere. Bernhardt doubted the expediency of it, and Remak regarded such interference as useless.

Differential Diagnosis.—Under the term "Acute Ataxia" Leyden¹¹⁴ groups cases in which the onset of the ataxia is sudden, of rapid course, sometimes quickly fatal, though often ending in recovery, being mostly cases of ataxia occurring after some acute disease, rarely arising spontaneously. He divides them into two groups,—the central (cerebral) form and the sensory form. The former is characterized by acute ataxia, without sensory disturbances, scanning speech, resembling the speech-disturbances of multiple sclerosis. The intelligence may or may not be affected. Recovery occurs in some cases after a few weeks; in others it becomes chronic and stationary, death occurring from some intercurrent disease. He considers the disease due, probably, to an acute multiple encephalo-myelitis, terminating in multiple sclerosis, in which injury and infectious diseases appear to be causes. In some cases syphilis has not been shown to be a factor; the lesion producing the ataxia he assumes to be located in the mesocephalon, chiefly in the pons. He cites cases reported by Westphal, 1 of his own, 1 following erysipelas (reported by Leyden and Renvers, which recovered in forty-one days), and 1 by Ebstein, following typhoid fever, in which multiple sclerosis of the brain and cord were found. The second form—sensory ataxia—is due to multiple neuritis, described by the French authors as pseudo-tabes or neuro-tabes peripherica. It is differentiated from the ataxia of tabes by its acute or subacute onset, by frequent termination in recovery, and the return of the knee-jerks. The sensory symptoms usually present are: pain, numbness, hyperæsthesia and anaesthesia. Disturbances of speech are absent. It follows exposure to cold and moisture, acute fevers, alcoholism, lead and arsenical poisoning, and possibly syphilis. Cases are also cited and reported of this type.

Return of the Knee-Jerk.—Hughlings-Jackson and Taylor²¹, report a case of tabes, in which two attacks of right hemiplegia occurred about a month apart. The patient's tabetic symptoms began twelve years previous, and he had a chancre twenty years before. On his admission to the hospital, after his hemiplegia, the knee-jerks were entirely absent, even with re-inforcement. One month after his second attack the right knee-jerk returned, but not the left. Ten

months later, the left knee-jerk re-appeared under re-inforcement, and finally without it, but feebler than the right. The reporters comment on the cases as follows: "Presumably, in the case of B., the return of the knee-jerks was contemporaneous with the establishment of sclerosis of fibres of the pyramidal tract in the bundle of deep fibres of the lateral column. It is well known that, in many cases of uncomplicated hemiplegia, there is exaggeration of both knee-jerks. It has been shown by Pitres, Schäfer, Sherrington, Hadden, Tooth, and others, that, at least in some cases of lesion of one internal capsule, there follows degeneration of fibres in both lateral columns. If, in the case of B., there has been, since January, 1890, double lateral sclerosis, his case, anatomically, is one of the 'ataxic paraplegia' of Gowers. Before the hemiplegia or before the lateral sclerosis was well established, it may be that from the sclerosis of the posterior columns there were too few fibres left intact in those columns for strong enough or sufficiently numerous impulses to act on the anterior horns concerned, so as to produce the jerk. Upon the ensuing of lateral sclerosis, according to current doctrine, the anterior horns become more excitable. Thus it may be that, after this change in the horns, the few fibres left intact in the posterior columns were sufficient for action on the horns, so that the jerk could be elicited. If this be so, and if the posterior sclerosis increases, the presumption is that the jerks will be once more lost. It is not likely that the lateral sclerosis will increase, at any rate so far as the lesion causing the hemiplegia is concerned with it."

Ocular Symptoms.—Boedeker⁶⁸ reports a case of chronic progressive paralysis of the ocular muscles in a patient suffering with tabes and general paralysis of the insane. It began with double abducens paresis, followed a year later by myosis, and, after four and a half years, other signs of tabes and of general paralysis developed (reduction of the knee-jerks, lancinating pains, vertigo, slight speech disturbances, and dementia); at the same time vision began to fail, and, finally, a reduction in all the ocular movements, except that of the levator of the lid. These ocular conditions remained stationary for eight years. The post-mortem examination revealed, besides the usual lesions of general paralysis of the insane and the sclerosis of the posterior columns, characteristic of tabes, degenerative changes in the nuclei and roots of

origin of the α bducens of both sides, also of the trochlearis and the greater portion of the oculo-motor nuclei roots and nerves. A part of the ascending root of the fifth nerve, and also the optic nerves, showed degenerative changes. The parts of the oculo-motor nuclei remaining normal were the posterior ventral, Westphal's lateral and median small-cell groups, and the anterior median nuclei. Fridenberg¹⁵⁷ reports a case of tabes with early ocular symptoms. After a severe fright the patient, a female aged 46, observed diplopia; soon after, attacks of abdominal pain, nausea, and vomiting occurred at intervals of three or four weeks, but without reference to the menstrual period; there was fatigue and occasional pains in the knees, attributed to work at a sewing-machine; myosis, Argyll-Robertson pupil, beginning optic-nerve atrophy; abolished knee-jerks, but absolutely no ataxia, anaesthesia, or paralysis of the extremities.

Throat Symptoms.—Ruault¹³⁸ reports a curious case of dyspnoea from spasm of the glottis in a tabetic, in which an unsuccessful operation for its relief was attempted. One and a half centimetres of the recurrent laryngeal nerve were resected, but the aspect of the glottis was in no way modified after the operation. The fragment of the nerve, examined histologically by Gombault, exhibited very marked pathological changes. Schnell¹⁴⁰ reports a case presenting the typical signs of tabes of many years' duration, in which lancinating pains occurred in the left side of the face, and in which the pharynx was insensible to the touch, and the uvula anaesthetic and paretic. Speech and deglutition, however, were not affected. The writer admits that it is not possible to determine whether the lesion producing the throat symptoms was central or due to a peripheral neuritis.

Crises.—Raymond¹⁴¹ reports the case of a man, aged 31, who died two years after his first symptoms of tabes, which consisted of crises of pain chiefly localized in the right side of the thorax, slight inco-ordination, abnormal pupillary reactions, abolition of the knee-jerks. The post-mortem examination revealed a normal condition of the peripheral nerves and the meninges, but in the cord a sclerosis, beginning in the dorsal region and increasing in intensity upward to cervical, limited to the median portion of the column of Burdach. This sclerosis was purely neuroglial, and independent of vascular changes. Laget¹⁴² relates

the following history of a case: A female, aged 60, entered the hospital with the typical signs of tabes, and this diagnosis was finally confirmed by an autopsy. This patient had submitted to the operation of nephrotomy, two years previous, upon the diagnosis of rebellious nephritic colic localized on the right side, caused by a calculus of the pelvis blocking the ureter. The operation served to demonstrate the entire absence of a calculus and to expose the error in diagnosis. Laget very properly says that this case shows that it is always well to think of tabes in diagnostinating abdominal affections accompanied by repeated attacks of pain, even in the absence of other sensory affections, motor or oculo-pupillary phenomena, or the preservation of the knee-jerks.

Trophic Symptoms.—Richardière,⁸ in a clinical lecture upon a case of tabes, gives an excellent description of the "tabetic foot." The increase in the volume of the foot is quite pronounced, somewhat suggestive of acromegaly. The length of the foot, however, is not augmented. The toes are enormous. The plantar arch has partly disappeared. On the right foot the great toe is absent, having been amputated for a perforating ulcer which occurred early in the course of the disease. Palpation shows that the increase in volume is due to a hypertrophy of the hard parts, the bones, and peri-articular tissues. The foot appears massive and compact; there is not the sensation of softness which oedematous tissues give. The different articulations of the foot are ankylosed. Movements of the foot give a sensation of crepitation, particularly in the region of the sheaths of the peroneal muscles. The toes have a special attitude, described by Joffroy as the "tabetic club-foot." The first phalanges are fixed, and the two last strongly extended upon the foot, maintained in this position by the extensor tendons, which form hard, resisting cords. This hypertrophy of the foot comes on in an almost imperceptible manner; slowly, without pain, without inflammatory reaction, the increase in volume is finally made evident, without much attention having been bestowed upon it by the patient, except that larger and larger shoes are necessary. This deformity of the foot is rare in tabes. It was first described by Charcot and Fétré in 1883, 5 cases having been observed. Autopsies show that the lesions are those ordinarily found in tabetic arthropathies. The deformity of the foot is due to lesions of the joints, of the bones, and of the peri-articular

tissues. There exists about the articulation a more or less firm oedematous substance. The peri-articular ligaments are hypertrophied. The synovial surface is destroyed in places, thickened in others. The cartilages are ulcerated or destroyed. The bones are considerably deformed; destroyed at certain points, thickened and hypertrophied at others, fragments form foreign bodies within the joint. The fragility and sponginess of the bones are explained histologically by the thinning which goes on from enlargement of the Haversian canals and destruction of the osteoblasts. The hands may be affected in a like manner. These arthropathies, affecting the small joints of the hands and feet, differ from the rheumatic forms of articular disease in the absence of pain, the deformities due to muscular retractions, and in their clinical course.

MacDonnell,¹ reports a case of tabes with gastric crises and osseous hypertrophies of the foot (tabetic foot), also some hypertrophy of the hand and an enlargement of the malar bone of one side. She had also sustained a clavicular fracture. Hinze²⁸ reports a case of tabes, developing after a fracture of bones of the leg, and followed by perforating ulcers of both feet as an early symptom. Philippescu²² describes a case of spontaneous fracture of the femur in a case of tabes, and discusses the question of the relation of syphilis to such lesions. He favors the view that it is dependent on syphilis. Kiwull²¹ has written a paper on the joint affections of tabes, with the report of a case of arthropathy affecting the ankle-joint.

Treatment.—Fraenkel,³⁴ in a paper on the therapeutics of ataxia, describes his method of training ataxic subjects to regain co-ordinative control over their muscles. They are instructed to perform different exercises, from half an hour to an hour and a half daily, beginning with simple movements of the fingers and other members, continuing with easy, co-ordinated movements, and finally taking up complicated co-ordinated exercises. The examples given are too numerous to repeat, but will suggest themselves to the instructor, the object being to slowly build up the co-ordinative functions by patient exercise and frequent repetition. He maintains that success attends his efforts.

Radcliffe⁸⁰ was induced to use the hyposulphite of sodium and silver in tabes, from a report by Curci, in which it is main-

tained that this double salt does not coagulate the albuminoids, is very soluble in water, is not caustic, is diffusible, and promptly absorbed from the mucous membrane and connective tissue. Its taste is sweet, and slightly nauseous. It should be given fasting, by the mouth, in from 5 to 20 centigrammes ($\frac{1}{2}$ to $3\frac{1}{2}$ grains) daily. Its action is quickly obtained, and danger from argyria is avoided. He has, however, the experience of but 1 case to base it on. In that one it was satisfactory. It can be used hypodermatically.

Among the peculiar therapeutic suggestions for tabes, may be mentioned Neilson's experiment¹⁹ with Koch's tuberculin. An injection was given, and repeated in two days; the treatment followed for three weeks. His pains were increased at first, then rapidly diminished, until, at the end of three weeks, they had entirely gone. His co-ordination was much improved, and his strength greatly increased. Another case, of six years' standing, was unable to walk, unless supported, from lack of co-ordinating power, and his pains were severe. He also received injections, and improved so as to be able to walk twenty-five minutes without assistance; his pains also ceased. Three other patients were still under treatment at the time these cases were reported.

Bartelink²⁰ tried subcutaneous injections of Poehl's spermin, in a case of tabes with inco-ordination and anæsthesia, with the immediate result of an increase in muscular strength, cutaneous sensibility, and ability to walk and run about a dark room. In twenty-four hours, however, this amelioration had entirely disappeared. In another tabetic, four injections failed to effect anything beyond a slight improvement in micturition. Jakovleff came to the conclusion that Poehl's spermin was closely allied to castoreum, musk, and like stimulating remedies.

Depoux²¹ relates a case in which there was inco-ordination, loss of muscular sense, absence of the knee-jerks, enfeeblement of the genital functions, fulgurating pains in the legs, and a slight degree of amblyopia. The patient had been subjected to suspension, electricity, cauterization, and the iodides in large doses, without benefit. It was decided to try Brown-Séquard's testicular fluid, according to his method, by injection. Remarkable to relate, this man actually recovered his strength; not the least inco-ordination remained, and the knee-jerks became normal.

Brown-Séquard remarked, in discussing the case, that we cannot positively affirm that this patient had sclerosis of the posterior columns, but that he had the symptoms mentioned, and that they had disappeared, is certain; the result, he thought, should be attributed to the injection of the testicular fluid. Déjerine took the view that the case was one of pseudo-tubes of peripheral origin, or of the purely dynamic type. Brown-Séquard replied that he would not contend, *à priori*, that a cure of tubes of central origin was possible, but several cures had been reported by Babinski, Benedict, Westphal, and others. Babinski remarked that his most remarkable case was that of a female who had been ataxic for twenty-three years, and also had fulgurating pains, gastric crises, atrophy of the optic nerves, absence of the knee-jerks, and other symptoms. In this patient the pains remained away for five years, and the gastric crises for a long time before death. At the autopsy, sclerosis of the posterior columns was found. He makes the important supplementary statement that the knee-jerks did not return. Atrophy of the optic nerves is included in an abstract of this report,⁶ as one of the defects which disappeared; probably an error, as it is not mentioned in the society report from which we quote. Such a case can hardly be called a cure, and Déjerine remarked that it was not infrequent to have a cessation or recession of many symptoms in cases where the optic-nerve atrophy was an early symptom, as Benedict pointed out long ago.

Arthur,² under the heading, "Case of Locomotor Ataxia Treated by Hypnotic Suggestion," describes a case which, from the description given, by no means appears like a case of tubes; atrophy of the legs and total anæsthesia below the knees, with absolutely agonizing and continuous pain in the limbs, the abdomen, and chest. The effect of hypnotism, with suggestion that the pain would cease, resulted in some relief after the first trial. Daily repetitions have kept him free from the pain except for a few hours of the day. Morphine, in 1-grain (0.065 gramme) doses, repeated once or twice, had no effect on the pain. His general condition improved, his appetite increased, and his mental depression became less. As the case was reported while still under treatment, whether the improvement will continue cannot be determined. The reporter simply lays stress on the fact that hypnotism gave relief when other means had failed.

There are reports of cases, which do not require special elaboration here, by Pershing, ⁹ June 18, ¹⁵⁵ Clark, ⁴⁷ Spring, ⁶⁶ Jolly, ⁶⁶ Adamkiewicz ⁶⁸; and papers on the general subject of tabes by Krafft-Ebing, ²⁸³ Brower, ¹² Leszynski, ¹⁰² Brown, ²³⁹ Aug. Reading. ¹⁹²

THE REFLEXES.

Eichhorst, ⁶⁹, reports an interesting observation pertaining to the knee-jerk in tabes. He calls attention to Westphal's discovery of the absence of the knee-jerk in tabes, and to his subsequent discovery that loss of the knee-jerk occurred only when the lesion involved that portion of the cord forming the transition from the dorsal to the lumbar sections, in its posterior root-zones. Eichhorst proposes to call this Westphal's region. In Martin's case of cervical tabes (ANNUAL, 1889), the knee-jerks were present, and the autopsy showed that Westphal's region had not been invaded. Eichhorst raises the question whether in all cases of cervical tabes the knee-jerks will be preserved if Westphal's region remain normal. He answers it negatively, and reports a case in proof. A woman aged 54, in whom the knee-jerks were absent, died suddenly of apoplexy. The lesions of tabes were found in the cervical and upper third of the dorsal region of the cord, while the lower dorsal and the lumbar portion were entirely normal. Fortunately, the crural nerves and their branches were dissected out for examination, and presented a high grade of parenchymatous neuritis, thus explaining the anomaly. Leyden suggested, some two years previous, that the absence of the knee-jerks might, in some cases, be due to a neuritis, and his view was opposed by Oppenheim. Eichhorst concludes that there are occasionally cases of tabes in which, notwithstanding the normal condition of Westphal's region, the knee-jerks are lost. In these cases the interruption of the reflex arc is not in the cord itself, but in the peripheral nerves, and due to a neuritis.

Goldflam, ⁴, reports 2 cases of tabes in which, after cerebral lesions, the knee-jerks returned. He expresses the view that the degeneration of tabes produces inhibition, and not destruction, of the reflex arc, and as a result of cerebral lesions, the higher inhibitory centres being removed, the lesions below are not sufficient to abolish the reflex.

Erb, ⁸⁴, ², in his paper on the reflexes, first discusses how

far the anterior cornual cells of the spinal cord are concerned in the production of a tendon-reflex, and he points out that many of the cells may be totally destroyed, and yet the tendon-reflexes will remain perfect for the rest of life, and he does not regard it as a satisfactory explanation that the remaining cells take on the function of those which are destroyed. Further, he argues that in many cases in which the loss of the reflexes has been attributed to destruction of the cells of the spinal cord the anterior nerve-roots have been severely damaged, and in progressive muscular atrophy the loss of the reflex does not take place till there is considerable change in the muscle itself. Erb next refers to the clinical fact that, after hemiplegia with secondary degeneration, there is often an increase of the tendon-reflexes on the non-paralyzed side; this most authors have been accustomed to refer to as an increase in the irritability of the reflex centres on the unparalyzed side, consequent upon their physiological association with those on the paralyzed side. Erb considers this hypothesis unnecessary, now that it is known that descending degeneration takes place on both sides of the cord. Lastly, he does not consider that in the explanations of the alterations of tendon-reflexes after apoplexy sufficient allowance has been made for the alterations produced in the surrounding parts of the brain by the vascular disturbances which must be associated with a large haemorrhage.

The Anal Reflex.—Rossolimo⁷⁵ says that, if the buttocks be separated,—a touch upon the skin around the anus or its mucous membrane,—a noticeable contraction of the external sphincter occurs. Increase of the stimulus causes the anus to be drawn in and the buttocks drawn together. He finds this reflex increased in neurasthenic subjects who have an increase of the cutaneous reflexes in general; in transverse myelitis located high in the cord; also in other states in which sensory nerves have their activities exalted. It is decreased in multiple neuritis involving the sacral plexus; in tabes, where the functions of the pelvic organs are involved, and with anaesthesia of the anal regions; in myelitis of the lower segment of the lumbar cord, which usually results in producing anaesthesia of the rectum, anus, and urethra. It is normal in functional neuroses of the bladder, and in neuroses of the genital organs and the apparatus for defecation.

The Virile Reflex.—This term has been given by Hughes⁷⁶

to phenomena which he describes as follows: If you take a perfectly healthy individual, place him on a couch supine, and make the sheath of the penis tense by clasping the foreskin with the left index finger and thumb, at about the place of the frænum, pulling it firmly toward the umbilicus, and placing the middle, ring, and little fingers low down upon the dorsum of the penis, for perceptive purposes, then sharply percuss the dorsum or side of the penis, near the perineal extremity, a quick and very sensible reflex motor response or retraction of the bulbo-cavernous portion will be felt. He calls this the "virile reflex," because it seems to be present in all healthy adult males with normal spinal cords, and absent in male children under the age of puberty. After prolonged venery it becomes impaired or disappears, to return again with sexual recuperation. It is not impaired in masturbation when the habit has not destroyed the sexual power. It is often, but by no means uniformly, found in sympathy with the other reflexes in spinal-cord diseases of the lumbo-dorsal region. It may be re-inforced, like the knee-jerk. A kind of erector-penis clonus, characterized by a succession of jerks, continuing after the percussion or while the foreskin is kept stretched, was observed in a case of transverse dorsal myelitis, with double ankle-clonus. It disappeared with the latter symptom.

SUSPENSION.

The literature on this subject has dwindled from its large volume, accumulated during the year following the announcement of this method of treatment, to a few review articles, during the present year, and the reports of a very few cases. One American writer, Potts,¹¹² _{Sept.} reports a single "case of locomotor ataxia successfully treated by suspension." Avrokratoff, of Warsaw,⁶ _{Jan. 10} reports 6 cases of tabes, 5 of whom were in no way improved; the sixth showed decided improvement. He is disposed to attribute the good effects of suspension largely to its psychological influence. Clark,⁶ _{July 12} who reported 14 cases in 1889, has increased the number to 29; of these, 24 were cases of tabes. The results were good in 5, improvement occurred in 6, slight improvement in 1, and in 10 cases the results were *nil*. Respecting the character of the effects produced, he says: "It may be stated, generally, that no change was noted in any of the following symptoms, in any

case in which they were present: loss of knee-jerk or of plantar reflex, Argyll-Robertson phenomenon, loss of dilatation of pupils to sensory stimulation, myosis, inequality of pupil, oculomotor palsy, or optic-disk atrophy; paralysis of cranial nerves, atrophic paralysis of muscles (tongue and thenar eminence), or any considerable degree of anaesthesia. In one case the knee-jerks, which were feebly present at the commencement, became lost in the year subsequent to the treatment. The chief modes in which improvement was shown were in a sense of general well-being, the patients nearly always stating that they 'felt better in themselves' for suspension; in increased strength and powers of walking; in lessened giddiness, but not always in the case of giddiness in the dark; in Romberg's symptom; in amelioration of lightning, rectal, and girdle pains; in regaining partially or completely the sense of position of the limbs, when that had been impaired or lost; and in improvement in feelings of numbness, tingling, and formication, and of light degree of anaesthesia. No constant effect on disorders of micturition could be traced; some patients, in this respect; the majority, not. Where the occurrence of gastric crises was a marked feature of the illness, suspension did not diminish their frequency or severity, and in some cases seemed to make them worse at the commencement. Of accidents, there were none." In discussing the question as to how suspension acts, he says that one cannot, in the consideration of tabes dorsalis, leave out of sight the disturbing influence of the morbid changes in the cord on the cerebral and cerebellar processes; and, again, the secondary effects of this disturbance on the mind and the emotions. The patient ceases to be able to distinguish what he can do from what he cannot do, loses confidence in his powers, becomes nervous as regards all motor action. Patients who thoroughly believe in suspension, in some unexplained way regain, during treatment, their lost confidence in their own powers. He believes that, in the feeling, general well-being, and of regained power of co-ordination it induces, its real *modus operandi* is to be sought.

In connection with this subject, the experiments of Reid and Sherrington, ⁴⁷ Winter No. 100 on the effect of movements of the human body on the size (capacity) of the spinal canal, are of interest. Their conclusions were as follow: 1. That when the body hangs freely and vertically from the skull, the capacity of the cranio-vertebral

canal is at a maximum. 2. That with the body in the above position, when the weight of the trunk and limbs is taken off by lifting and supporting the body vertically, there is a diminution in the capacity of the crano-vertebral canal, but the diminution is a very slight one. 3. That when the vertebral column is bent backward or forward, especially in the former direction, there is a not inconsiderable diminution in the capacity of the crano-vertebral canal, as compared with its capacity when the body is hanging freely and vertically. 4. That the alteration in the curvatures of the spinal canal by various movements of the body do influence the capacity of the canal, but not to any great extent; much more, however, in the child than in the adult. They also state that, from the above movements, it would appear that, by suspension, the size of the spinal canal is increased in the adult of middle age to the extent of some 100 cubic millimetres. Estimating the total capacity of the canal at 102 cubic centimetres, this measurement means an increase in the size of the canal to the extent of $\frac{1}{102}$ of the whole canal. This increase is so small that it becomes difficult to conceive how, in the "suspension" treatment, there can, as has been sometimes claimed, be any actual stretching of the spinal cord.

TREATMENT.

R. von Hoesslin, ³⁴ in a paper on the treatment of chronic affections of the spinal cord, recommends the use of cold water as a cutaneous irritant, maintaining that an experience of five years has convinced him of its great efficacy in tabes, multiple sclerosis, lateral sclerosis, and particularly in chronic forms of myelitis; improvement following, respecting ataxia, paresis, and sensory disturbances. In giving details as to the best procedure, he says that in order to produce a reflex irritation of the vessels in the cord, by means of the peripheral application of cold, it is of the utmost importance that the parts to which the application is made—usually the lower extremities—should be warm, and present an active circulation. But as it is in just the class of diseases mentioned that the circulation is often poor, the skin cold and livid, or even œdematosus, application of cold, under such conditions, would only increase the coldness without producing a reaction. It is, therefore, necessary, under such circumstances, to warm the extremities and restore the circulation temporarily before applying

cold. Sometimes this may be accomplished by simply wrapping the members in warm covers, or warm, moist wrappings may be applied; in case these are not sufficient, hot, dry cloths or hot-air or vapor baths may be employed. When the members have been sufficiently warmed, cold must be immediately applied, so as not to allow a moderate cooling to take place. Cold, wet cloths may be applied, or cold water poured over the legs; those who are sufficiently strong, and who react well, may tolerate immersion of the legs in cold water. The temperature of the water must be low; 7° to 15° R. (48° to 66° F.) is the range usually employed by the writer, but the application must be of very short duration,—one-quarter to one minute. The members are then to be quickly dried and well covered, and the patient should lie quiet for from half an hour to one hour. Time and temperature must be varied according to the reactions obtained. Sometimes after two or three weeks the tissues become accustomed to this form of irritation and no longer respond to it. It is then desirable to discontinue it for an interval, resuming it later.

PERIPHERAL NERVOUS DISEASES, MUSCULAR DYSTROPHIES, AND GENERAL NEUROSES.

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SPINAL AFFECTIONS.

Spastic Paralysis of Children.—Sympson⁵¹ gives a review of the subject, which contains little that is new. He holds that the majority of congenital cases are due to meningeal haemorrhage, and that haemorrhage is also the most important factor in the acquired cases.

Friedreich's Ataxia.—Ladame^{47, 50} has published an exhaustive critical and historical review of the literature of the subject, with the report of a case. He lays stress upon the heredity of the affection, but he believes that external influences must also be considered, although where direct heredity exists the exceptions to this rule are not rare. Alcoholism in the ancestry is not uncommon. The history of Ladame's own case furnishes, as he thinks, a typical picture of the symptomatology, which may be thus recapitulated: Slow and progressive ataxia of the four limbs, usually attacking several children in the same family and dating often from a very early age, beginning in the legs, extending gradually to the trunk and arms, the muscles of the larynx and those of the tongue and of the eyes; weakness of the legs; increasingly difficult gait; choreiform unsteadiness; static ataxia; difficulty of articulation; spinal curvature; nystagmus; club-foot; absence of knee-jerks; absence of sensory disturbances, of oculo-pupillary anomalies and of lightning pains; integrity of the sphincters. On this basis, Ladame rejects a number of cases which have previously been regarded as cases of Friedreich's disease. He considers absence of the knee-jerks to be an absolute rule in the disease, and distrusts the diagnosis whenever the knee-jerks are present. He regards the ataxia as being in no way of a sensory character. A symptom which he looks upon as of early onset, and somewhat

characteristic, is the dorsal extension of the great toe which occurs in the club-foot, differing in this respect from the condition in ordinary tabes, where the toe is extended. Ataxia, the progressive course, the gait, the absence of remissions, slow speech, nystagmus, abolition of knee reflexes, scoliosis, and the peculiar deformity of the foot are the characteristic symptoms in diagnosis, together with certain negative symptoms,—the absence of lightning pains and anaesthesia, the normal reaction of the pupils, the integrity of vision, the absence of any genito-urinary trouble, and of syphilitic antecedents. Pathologically, Friedreich's ataxia is a combined sclerosis of the spinal cord, in which several systems of fibres have been affected from birth or during infancy. There is an arrest of development in the cord, and the fibres of these systems degenerate before attaining their full growth. Friedreich's ataxia is distinguished, pathologically, from tabes by the combined primary systemic sclerosis of the spinal cord, by the degeneration of the direct cerebellar and of the crossed pyramidal tracts, by the pronounced atrophy of the cells and the fine fibres of the columns of Clarke, whilst the marginal zone of Lissauer always remains intact. In tabes the peripheral nerves are often degenerated and the marginal zone is constantly degenerated. In the other combined scleroses we meet with the most varied lesions, whereas, in Friedreich's disease, the seat of the systemic localization is regular. Ladame considers the prognosis as regards life as not materially bad, but the affection is incurable. Careful prophylaxis may do something to prevent the development of the disease. Electricity and suspension afford some relief.

Inglis⁶¹ reports a case of the disease in a boy of 6, and, from a review of the autopsies, considers that the disease affects tracts which degenerate upward, and are usually looked upon as centripetal and as conveying sensory impulses. He says that the symptoms of the disease demonstrate that these tracts do not convey sensory impulses, for sensation is not impaired, but that they are the main tracts for conveyance of co-ordinated motor impulses downward,—a theory which is strengthened by a study of the development of these tracts, for the posterior columns and the cerebellar tracts are complete before the pyramidal tracts are developed.

Mendel^{4, 24, 70} enumerates the symptoms of the disease as ataxic motor disturbances of the hands and feet; ataxic disturbances of

speech; nystagmus; deformity of the feet, with the great toes permanently extended dorsally; failure of the knee-jerks; no disturbance of sensibility; no disturbance of the visceral reflexes.

Friedenreich⁸⁷³ _{Jan. 14} reports a case which seemed to him to have been congenital, but which grew rapidly worse after an acute disease. In this case there was atrophy of the optic nerves.

Caisson Disease.—C. P. Knapp⁸⁷⁷ _{Oct.} reviews our knowledge of the disease and reports 22 cases, giving rules for prevention, which are substantially those given some years ago by Smith, with whom he agrees in commending the use of erget.

Landry's Paralysis.—Klebs⁶⁹ _{Jan. 15} reports a case of Landry's paralysis in which the autopsy showed pericardial tuberculosis and widely distributed hyaline thrombi in the branches of the central artery of the spinal cord, which were most numerous in the lumbar region. As secondary phenomena there were found minute haemorrhages and exudations, especially in the ganglion-cells, which the author considers as necessary results from the circulatory changes. The peripheral nerves were intact. The changes in the ganglion-cells he considers can be explained by the morbid process occurring in the central artery of the cord. The cause of the thrombosis is to be found, probably, in the action of some poison.

Kirilzew and Mamurowsky⁸⁸ _{Nov. 30} report a case with autopsy, in which there was a well-marked acute primary parenchymatous neuritis, affecting especially the nerves of the feet, legs, and forearms, and to a slight extent the roots of the cervical and lumbar enlargements of the spinal cord. The cord itself showed hyperæmia of the gray substance, cloudiness, and a slight atrophy of the anterior ganglion-cells and an accumulation of cortical cells in and about the central canal. They hold that in almost all cases Landry's paralysis is a variety of acute multiple neuritis.

Hun¹ _{May} reports a case, with autopsy, which was practically negative. He found a slight cerebral and spinal meningitis, an infiltration of the walls of some of the veins of the spinal pia mater, and a degeneration or neuritis of some of the fibres of the anterior roots of the cauda equina, the central nervous system in every respect being normal. The symptoms in his case were a steadily progressive loss of power, beginning in the ankles and extending upward, finally involving the face and the muscles of

respiration. There were no sensory symptoms, nor any atrophy, or tremor, or muscular tenderness. The muscles responded normally to electricity. The reflexes were absent. Cultures were made from the various parts of the nervous system, but no bacteria were found. Brown²³⁹ reports a probable case which recovered.

In last year's ANNUAL (vol. ii, C-28) the various theories as to the nature of this affection were discussed. The further work of this year seems to indicate that there is an affection marked by a rapidly-ascending paralysis and by an absence of sensory symptoms and of muscular atrophy, in which there are no discoverable changes in the nervous system, which some cases of acute neuritis and of acute poliomyelitis may very closely resemble. This may account for the various views as to the pathology of the affection, and may, perhaps, explain the contradictory autopsies.

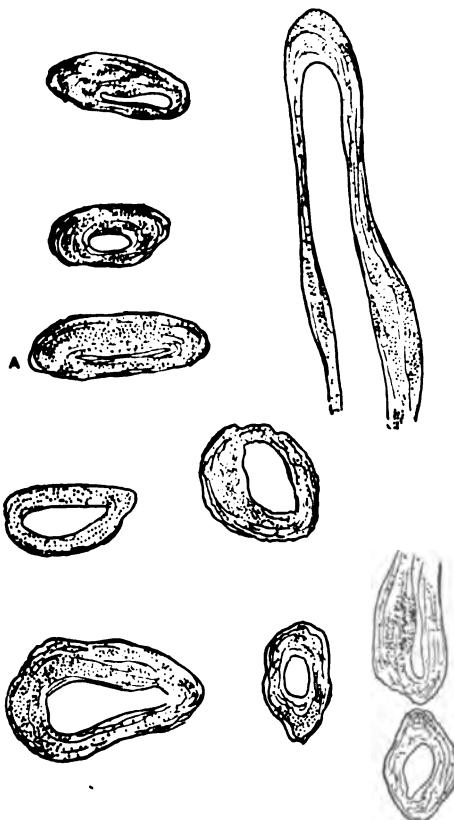


FIG. 1.—SHOWING THE INFILTRATION AND THICKENING OF THE WALLS OF THE SPINAL VEIN.
In the section A the walls have collapsed so that the lumen is artificially closed. The lumen is nearly normal.
(New York Medical Journal.)

brane of the eye or the nose has an inhibitory effect upon spasm of the glottis, and concludes that mechanical irritation of the fifth nerve may exert a reflex action upon the laryngeal nerve. He has employed this in the treatment of one or two cases of spasm of the glottis.

Abducens Nerve.—Dufour²³⁸ has studied 3 cases of bilateral paralysis of the sixth nerve which were attended by some diplopia

AFFECTIONS OF INDIVIDUAL PERIPHERAL NERVES.

Trigeminal Nerve.—Kürt²⁴⁰ has found that irritation of the mucous mem-

and by a convergent strabismus. In these cases there was a probable chronic cerebro-spinal disease,—such as tabes,—which was regarded as the cause of the affection. Mabboux²¹ reports a case of paralysis of the sixth nerve in a patient with diabetes. There was an abolition of the co-ordinated movement between the right external and left internal recti muscles, which was regarded as indicating a central origin. In such cases diabetes should always be thought of. Mabboux cites the conclusions of Graux, who showed that the pathological change in the nucleus of the sixth nerve gave rise to a paralysis of the corresponding external rectus, with a conjugate

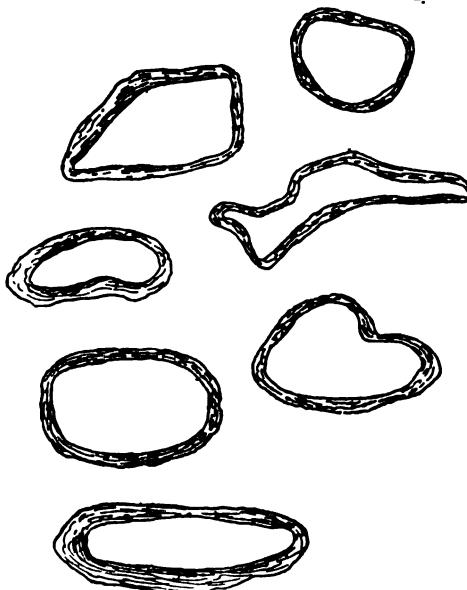


FIG. 2.—SECTIONS SHOWING THE NORMAL STRUCTURE AND THICKNESS OF THE ANTERIOR SPINAL VEIN.

Taken from a larger cord, having a correspondingly larger vein than in Fig. 1.

(*New York Medical Journal.*)

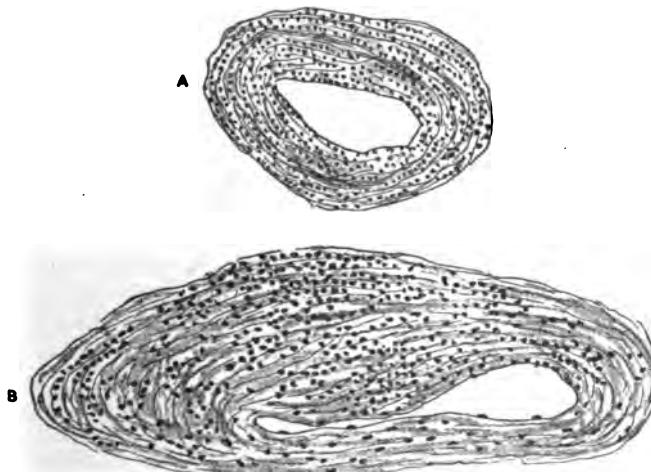


FIG. 3.
A, thickened and infiltrated vein accompanying one of the anterior dorsal spinal nerve-roots; B, thickened and infiltrated anterior spinal vein.
(*New York Medical Journal.*)

inaction of the opposite internal rectus. This paralysis was not

always absolute; it was present in distant but not in near vision. The presence of this symptom showed the disease to be central.

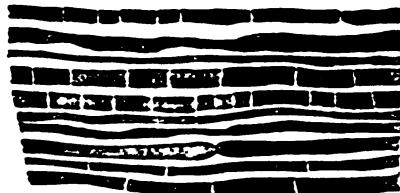


FIG. 4.—SHOWING THE AVERAGE NUMBER OF DEGENERATED FIBRES IN THE ANTERIOR ROOTS OF THE CAUDA EQUINA.
(*New York Medical Journal.*)

In peripheral paralysis of the sixth nerve it was never seen. In central paralysis of the sixth nerve the secondary deviation con-

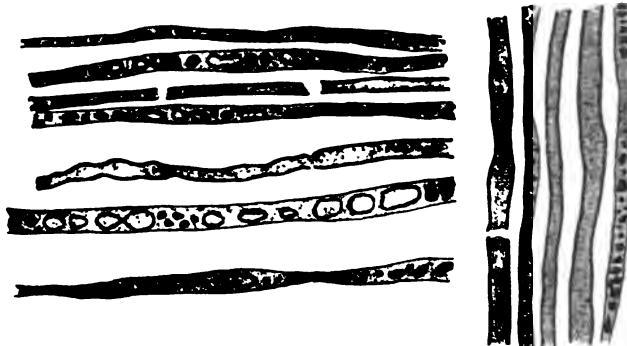


FIG. 5.—FROM A PLACE SELECTED TO SHOW THE MAXIMUM NUMBER OF DEGENERATED FIBRES.
(*New York Medical Journal.*)

sisted of an external strabismus, in peripheral paralysis of an internal strabismus, and this combination was explained by a

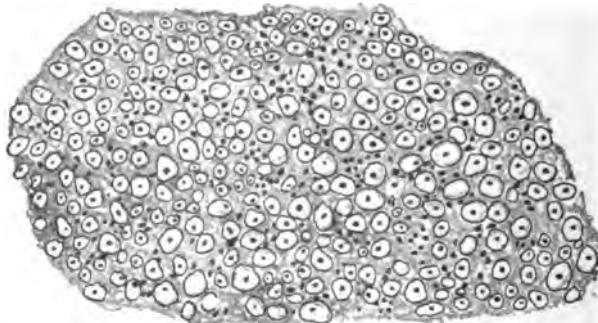


FIG. 6.—SECTION SHOWING THE NUMBER AND DISTRIBUTION OF THE CELLS IN THE CAUDA EQUINA.
(*New York Medical Journal.*)

fasciculus passing from the nucleus of the sixth nerve to the internal rectus of the opposite side.

Facial Nerve.—Minkowski⁴, reports a very typical case of rheumatic facial paralysis, in which an autopsy was obtained. The nerve, up to and including the geniculate ganglion, was entirely normal, but from the ganglion outward to the periphery there was found a highly advanced stage of degeneration, most marked toward the peripheral branches of the nerve, and which could be traced into the canal up to the junction of the nervus stapedius. Beyond this point the signs of degeneration gradually disappeared, but it was not until the geniculate ganglion itself was reached that the nerve appeared perfectly normal. The most notable point was that nowhere, not even in the Fallopian canal, were there any evidences of change traceable to inflammatory processes in the neurilemma. The nerve was not adherent to the canal, there was no increase of the connective tissue or alteration in the vessels, and the perineurium was normal. There was nothing whatever to uphold the prevalent idea that the cause of rheumatic paralysis is inflammation of the neurilemma and consequent compression, and, as a result, nerve degeneration; but there was a pure degenerative neuritis, produced probably by injury to the nerve-substance itself. Schiff¹⁹⁷ has studied the facial paralysis produced by section of the nerve. For the first 4 or 5 days excitability of the muscles is increased; then comes a period of fibrillary oscillations, which increase for 10 or 12 days and then become stationary, persisting if there is no regeneration of the nerve. After the fifth day the cervical sympathetic takes on a pseudo-motor property, and stimulation of this nerve will cause slight movements of the lips. After 10 or 12 weeks fascicular movements of a reflex and voluntary character are noted in the face, which are not present if the fifth nerve has also been cut; these movements are allied to those seen after stimulating the sympathetic.

Frankl-Hochwart⁸, has found, after examining 20 cases of facial paralysis, that in 3 there were sensory and vasomotor disturbances, in 5 sensory disturbances, and in 2 vasomotor disturbances. The sensibility was very slightly altered, invading the cheek and mucous membrane of the tongue. In several cases, but not in all, the taste was altered. He presumes from this the nerve contains both sensory and vasomotor fibres. Debove¹⁰⁰, has noted certain associated movements in facial paralysis. He reports the

case of a patient who could not speak without closing his eyes. Hitzig has attributed this condition to a state of abnormal excitability of the bulbar nuclei, but Debove considers that it is due to the extreme exertion which is required to produce the slightest movement of the lips, and that the effort overflows into the other branches of the facial nerve. Cases of double facial paralysis are reported by Bassette, ¹⁹ Althaus, ²⁰ and Delprat. ²¹ A brief review of the symptoms of ordinary facial paralysis is given by Legendre, ²² and cases are reported by Coltman, ¹⁹ and Graham. ²³ Mascarel ²⁴ claims that much more rapid results are obtained in the treatment of facial paralysis by acupuncture combined with weak faradic currents.

Sympathetic Nerve.—Nagy ²⁵ reports a case of unilateral paralysis of the sympathetic in which there was inequality of the two halves of the face: the opening of the right eye was smaller; there was ptosis, but the upper lid could be raised somewhat; the right eyeball was sunken; the right pupil was smaller, but the ordinary drugs caused dilatation and contraction, and cocaine caused anaesthesia; the skin was paler, the temperature of that side of the face diminished. The patient complained of headache upon that side of the head and of tinnitus in the right ear.

Pneumogastric Nerve.—Hujsman ²⁶ reports a case of a stab in the neck, followed by complete paralysis of the recurrent laryngeal nerve, with contracted pupil (which reacted slowly), retroaction of the ball, and slight ptosis. Boulland ²¹² _{Oct. 10} reports 2 cases of fatal paralysis of the pneumogastric, developing after otitis media, due possibly to extension of inflammation. Rendu ²⁷ reports a case of paralysis of the diaphragm which recovered, due probably to an inflammation of the phrenic and pneumogastric nerves, following a periesophageal abscess.

Spinal Nerves.—Cases of neuritis from involvement of a nerve in a cicatrix are reported by Hawthorne ²¹⁸ _{Apr.} and Le Bec ¹⁵² _{Jan. 11}; one of neuritis from involvement of a nerve in a callus, by Trelat. ²⁸³ _{Mar. 14} Gessler ¹⁸³ _{Feb. 22} reports a case of Erb's plexus-paralysis, associated also with paralysis of the supra- and infra- spinati and rhomboideus. Benzler ⁶⁹ _{Dec. 10, '90} describes a case of paralysis of the supra-scapular nerve in which there existed atrophy and paralysis of the supra- and infra- spinati muscles, with partial reaction of degeneration. The case proved Duchenne's statement, that this

muscle lifts the arm and draws it forward and outward. Potts¹¹² reports a case of paralysis of the deltoid muscle, due to pressure on the axillary nerve. Cases of radial paralysis are reported by Turner,⁸⁴⁹ Dombrowsky,²¹ and Seeligmüller.⁸⁴ In the last 2 cases there was a history of lead poisoning as well as pressure. Zabloudowsky⁵⁸⁶ commends massage in pressure paralysis.

King⁵⁵⁷ has studied the degree and distribution of sensory paralysis in lesions of the median and ulnar nerves, and comes to the following conclusions: 1. That where the median and ulnar nerves are both interrupted, (a) only a small portion of the median sensory area remains paralyzed, and the partial anæsthesia of the rest of the area tends to diminish in intensity and extent; (b) most of the ulnar sensory area remains paralyzed, but an advance of sensibility tends to take place in a radio-median direction on the dorsum. 2. Section of the ulnar nerve alone gives rise to more extensive and profound paralysis than section of the median alone; but eventually, even in the case of the ulnar, there is a tendency to some restoration of function. 3. That (as a corollary) the partial retention or restoration of sensibility in the area of distribution of a sensory nerve is not to be regarded as evidence that the nerve has not been completely divided, or that its continuity has become restored. Neuralgia, though of peripheral origin, will not necessarily be cured by section of the nerve supplying the painful area, quite apart from possible restoration of continuity. 4. The dorsal surfaces of the middle and distal phalanges of the second and third digits are supplied by the median, and not by the radial and ulnar nerves, as frequently described. The cause of the partial retention and restoration of sensibility is thought to be due to the fact that each nerve sends fine fibres into the territory of the other, and supplies in part the fine net-work of fibres in the hand.

NEURITIS.

Teuscher²⁹ has recently studied the process of degeneration of fibres in normal nerves, investigating still further the views of Mayer, who maintained that such a degeneration is a physiological process. The method adopted was that of Marchi, with a mixture of Müller's fluid and osmic acid. He investigated, as a rule, the radial, crural, and genito-crural nerves, both in longitudinal and in cross sections, in people who died from wasting diseases,

and also in one or two patients who died from accidents. He found that a marked cachexia is not accompanied by corresponding destruction of nerve-fibres, but it was even more marked in the nerves of a healthy workingman. He therefore regards the destruction of nerve-fibres as a physiological process. In the newborn, however, he did not find such degenerated fibres.

Marenghi and Villa,⁵⁶⁹ have continued the investigations of Golgi upon the peripheral nerves, especially in regard to the spiral fibres which Golgi observed. They find that these fibres are generally distributed along the nerve-fibres, thereby disproving the assertion of Cattani, who limited them to the incisions of Schmidt. In rare cases they found a very fine thread, in the form of a spiral, within the medullary sheath, and also longitudinal fibrillæ, giving the reaction of elastic fibres upon the external surface of the nervous fibres. By Golgi's method they succeeded in demonstrating clearly the periaxillary and perimyelinic sheaths. Kronthal,⁶⁸ in a case of bulbar paralysis, where he found extensive degeneration of the motor cells in the medulla and cord, found also degeneration of the cranial nerves, but no degeneration of the spinal nerves. He considers this due to the fact that the spinal nerves contain also centripetal fibres, so that the sources of irritation of the nerves are not entirely lost, and therefore there is not an atrophy from inactivity. D'Abundo,⁸³⁴ has studied the inflammations of the nerve produced by inoculation of tubercular bacilli and pneumococci into the neighborhood of the sciatic nerve. These inoculations produced interstitial inflammation of varying intensity, with atrophy and degeneration of the peripheral segment, but he never found an ascending neuritis, even in animals where he had previously produced lesions of the central nervous system.

Multiple Neuritis.—Standhartner⁵⁷ reports a case of acute neuritis affecting the sixth and seventh cranial nerves, as well as the nerves of the extremities and thorax, coming on in a laborer after exposure to cold. The muscles of respiration were finally affected, with a fatal result. The autopsy showed œdema of the lungs, with considerable congestion of the brain, and also acute neuritis. Render²³⁴ reports a case of progressive paralysis of three months' standing, extending from the legs to the arms, and finally to the cranial nerves, with disturbance of speech and loss

of vision ; sensory symptoms were entirely wanting, but there was pronounced muscular atrophy, with reaction of degeneration, glossy skin, and certain other changes in the skin. The tendon reflexes were lost, and there was no pain. There was also paralysis of the bladder and rectum. From the slower onset, the persistence of skin reflexes, and the affection of the bladder and cranial nerves, the author somewhat unjustly decides that the affection was a multiple neuritis, and not an anterior poliomyelitis.

Pal²⁰⁸⁴ has recently published an important monograph, reporting 8 of his own cases, 4 of which came to autopsy. In all of his cases he found changes in the central nervous system, as well as in the nerves. His first case presented a picture of Landry's paralysis, which rapidly became fatal ; besides peripheral neuritis, there was hyperæmia of the nerve-centres. In the second case, besides neuritis, there was a partial degeneration of Lissauer's zone of the posterior roots and changes in the lateral column in the lumbar region, and in the cervical region there were changes in Goll's column. In the third case there were marked changes in Goll's column, and also in the anterior columns in the cervical region ; degeneration in the cerebellar tract and in the anterior gray matter was also observed. From these cases, and a very exhaustive review of the literature, Pal concludes that, although in some cases multiple neuritis may be an affection of the peripheral nervous system, independent of any disease in the spinal cord, in other cases the central nervous system, especially the cord, becomes diseased ; all regions of the white matter of the cord become involved. There is no limitation of the degeneration to definite tracts. He believes that in such cases we have not to do with a systemic disease, but with a focal degeneration, and that the nerve-fibres of the cord degenerate in the same way as those of the peripheral nerves ; but he does not think that the cells of the anterior cornea undergo any changes or have any influence upon the process in the nerves.

Brissaud²⁰⁸⁴ studied a case of alcoholic neuritis, which was located in a definite portion of the sacro-lumbar plexus, namely, in the regions supplied by the crural, obturator, sciatic, and external popliteal ; that is to say, by the nerves given off from the second lumbar to the first sacral roots. Besides the neuritis, there was herpes zoster in the same region. He reviews the opinions

which have been expressed by other authors as to the affection of the cord in cases of neuritis, and thinks that this limitation of symptoms to a definite portion of the nervous system suggests that the spinal centres have also been involved; and he accepts Erb's hypothesis of a dynamic alteration in the nervous centres giving rise to changes in the peripheral nerves. He considers his views to be supported by Déjerine's observations of muscular atrophy in hemiplegics, where there were no changes in the anterior horns, but where the nerves to the affected muscles were degenerated, there being no muscular atrophy except in the paralyzed regions. He therefore concludes that the nervous centres exert an influence upon the production of peripheral lesions.

Déjerine⁸ reports the case of a man, who, for six years, had paralysis and atrophy of the muscles of the extremities, trunk, tongue, and jaws. At the end of that time, all the muscles, except those of the legs, had recovered their strength, and the muscles of the legs had improved. The atrophy was an atrophy in mass, affecting all the muscles; the knee-jerk, which had been lost, had returned, and fibrillary contractions (which had existed, together with vasomotor troubles in all the limbs) were found only in the legs. There was also reaction of degeneration. From the fact of recovery, Déjerine considered that the nerve-cells must be intact, and that therefore the patient had suffered from neuritis. In a second case, the tongue, pharynx, and lips were paralyzed, together with the limbs; the limbs were also atrophied; the faradic contractility was diminished; the knee-jerks lost, but the sphincters were intact, and sensibility was preserved. After eight months he began to improve, and made a complete recovery; but after this he had a third attack, when the muscles of the eyes were also affected. He regards this as a systematized motor neuritis of subacute course, distinguishing it from other forms of neuritis equally subacute, which are accompanied by sensory troubles. The diagnosis between such conditions and the forms of paralysis with atrophy, due to lesions of the cord and bulb, rests mainly upon the course of the affection: fatally progressive in central lesions, but curable in peripheral lesions. The diagnosis, therefore, cannot be made until after the patient has been under observation for some time. In the neuritic affections, the paralysis and atrophy are usually more generalized than in the incurable

central forms. Hirschheydt²¹ has studied the differential diagnosis of poliomyelitis and multiple neuritis. He shows that Remak's hypothesis, that the distribution of the paralysis might aid in distinguishing between an affection of the cord itself and of the peripheral nerves, cannot be absolutely maintained, and that only to a certain degree can the persistence of the reflexes be of service in determining the spinal nature of the affection. He considers, however, that in very many cases a functional disturbance in the cord may give rise to distinct degeneration in the nerve-fibre. Lorenz¹¹⁴ has studied a case of multiple neuritis, with especial reference to the relation between multiple neuritis and vascular disease. He opposes the views of Minkowski, that there is a primary vascular disease and a secondary degeneration of the nerves, but believes that the same virus, possibly a virus caused by the abuse of alcohol, gives rise to the vascular changes, and also to the changes in the nerves.

Bielchowsky⁷⁵ has noted distinct changes in the nails in a case of neuritis. The finger-nails only were affected, white spots appearing at first, until a wide band was formed which divided the normal substance above from that below; the discoloredation was found to be due to the presence of air. Finny¹⁶ reports numerous cases of neuritis resulting from various causes. Havage⁹² and Westphal⁶ report cases of typical neuritis following influenza. Cases of neuritis are also reported by Sansom,⁶ Hervouet,¹²⁷ Havage,⁹² Capozzi,⁵⁸⁹ and Sherwood,²⁰ the latter's cases being recurrent.

Korsakow²⁹⁵ has studied certain mental disturbances of neuritis, especially pseudo-reminiscences or false recollections, which may give rise to more or less fixed delusions. These false recollections often arise from the remains of certain real recollections developing in the unconscious sphere, and are brought forward by processes of association. Brie²⁹⁵ has reported a case where there was the same disturbance of memory and confusion with pseudo-reminiscences in multiple neuritis, but where there was no abuse of alcohol. Brasch⁷⁵, reports a case of neuritis where the urine on 2 occasions assumed a dark-red, bloody appearance, which lasted for days, the color being due not to blood, but to urobilin. Nothnagel²⁸³ reports a case of a young man who complained of severe pain in the legs, with wasting, contractures

and tenderness, associated with advanced phthisis. He considered the symptoms due to a tubercular neuritis. Cases of neuritis are also reported by Paterson,¹³¹ Maclagan,² and Déjerine,³¹⁹ in which the lesions seem to have started from a haemorrhage about the nerve.

Goldflam,¹¹⁴ has published a case of recurrent paralysis affecting all four of the limbs and lasting two or three days. During these attacks the reflexes were abolished, the electrical excitability diminished, although it was normal during the attacks. Eleven members of the patient's family were subject to similar attacks. Goldflam has succeeded in collecting from literature 7 other cases.

Arsenical Neuritis.—Marik, in a recent discussion before the Medical Association, Austria,⁵⁷ stated that, owing to the greater use of arsenic for domestic ornamentation, arsenical poisoning was more frequent in other countries than in Austria. Eppinger thought that arsenic also exerted an indirect action upon the fluid tissues of the body, especially the circulation, and gave rise to congestion and haemorrhage in the central nervous system. Müller considered arsenical paralysis a toxic neuritis, as it always attacked the peripheral nervous system, and the paralysis resulting therefrom was always acute,—an opinion which was doubted by Werdnig, who believed that, although the onset of paralysis was usually rapid, it was often produced by a severe cachexia. Folsom,⁹⁹ reported a case of arsenical paralysis in which there was also mental failure, which he thought was possibly due to the arsenic. In the discussion, Putnam called attention to the frequency of arsenical poisoning, which gave rise to various affections of the mucous membrane, of the skin, as well as to anaemia and affections of the peripheral nerves. Symptoms may long outlast exposure and grow worse after the injection of the poison has disappeared, and where one person is suffering from the poison another person in the same house may be entirely unaffected. Children seem somewhat less susceptible to arsenic.

Syphilitic Neuritis.—Fordyce²⁴⁵ reports a case of facial paralysis and one of multiple neuritis in patients suffering from syphilis, to which he considered the affection due. Both patients improved rapidly under appropriate treatment. Two cases of probable syphilitic neuritis are also reported by Ehrmann.⁵⁷

Rheumatic Neuritis.—Gordinier¹ describes the case of a

patient who, after an attack of acute rheumatism, had a very distinct peripheral neuritis, with tenderness of the muscles and nerves, atrophy, anæsthesia, and the loss of knee-jerk and reaction of degeneration. The patient died of cardiac disease. The cord was healthy, and interstitial neuritis, with degeneration of the nerve-fibres, was found in various nerves. A case of probable rheumatic neuritis was reported by Pepper. ⁹⁹ June 20

Diphtheritic Neuritis. — Ross ⁹⁹ has continued his lectures upon peripheral neuritis, noticed in last year's ANNUAL, with a consideration of diphtheritic neuritis. In the majority of cases the paralysis begins from eight days to three weeks after every trace of local diphtheria has subsided. The paralytic phenomena are said sometimes to be ushered in by general symptoms. In 128 cases out of 171 the function of the palate was disturbed. In 30 of the cases there were disturbances of the pharynx, tongue or larynx. In 77 cases the muscles of the eyes were affected, the disorder most frequently observed being the loss of power of accommodation. In 13 cases the lower extremities were affected, either in the form of complete paralysis or of weakness, disordered gait, or ataxia. In 60 cases the upper extremities were involved; in 23 the paralysis was complete, or so great that the patient was not able to raise his arms; in other cases the arms were simply weak. In 58 cases the muscles of the trunk, chest, or neck were affected so that the patient was unable to sit up or hold the head erect. In 33 cases the muscles of respiration were affected, the patients suffering from disturbance of breathing or rapid respiration, which in 25 of these cases proved fatal. Sensory disturbances were also common, being present in 86 out of the 171 cases. He believes that motor paralysis is almost always accompanied by some disturbance of sensibility, for in many cases, especially in children, the sensory symptoms cannot be accurately determined,—these symptoms varying from mere sensations of tingling to pronounced anæsthesia. In a very few cases the special senses are also affected. Reflex action is less commonly affected. In a certain percentage of the cases the palate reflexes seem to have been lost; the cutaneous reflexes are apt to be diminished and the knee-jerks lost. The electrical reactions were examined in only a few cases. In some of these there was distinct reaction of degeneration, and the muscles were occasionally wasted. Disorders of secretion and

vasomotor disorders are occasionally seen. The visceral functions are often profoundly affected, the heart being especially often involved. Of the 171 cases 126 recovered and 45 died. In the cases which recovered, the affection lasted from a few days to a year. He considers that the average duration is at least four months. In 19 cases autopsies were made. In 10 cases changes were discovered in the peripheral nerves, the nerve-roots, or the anterior horns of the spinal cord.

Beriberi.—Musso and Morell¹²⁵ have made bacteriological investigations upon a case of beriberi. They removed the skin and obtained cultures by the insertion of platinum needles into the tissues. In the tubes in which cultures developed there was found a special type of micro-organism, which had a spherical or spheroidal form, united into groups of diplococci or tetracocci, the microbe having a capsule. On gelatin plates the colonies were in the form of white drops of a yellowish tint and some granules. The gelatin was not liquefied. Inoculations of these coccii were made upon rabbits and produced neuritis, and the cultures from the rabbits gave positive results. Miura¹²⁶ has investigated certain cases of beriberi in Japan. He finds that paralysis of the diaphragm is not uncommon in severe cases, and that the pulse-curve greatly resembles that of aortic insufficiency, pointing to a hypertrophy of the heart and laxity of the blood-vessels. Owing to the paralysis of the diaphragm, coughing is rendered very difficult and dyspnoea is not uncommon; anaesthesia and paraesthesia are frequent, beginning, as a rule, in the region of the peroneal nerve. Sutliff¹²⁷ reports certain cases of beriberi seen in Japan and Hawaii. The patients complained of swelling in the legs, inability to walk without effort, and unsteadiness upon the feet. There was some fever and a rapid, full pulse; shortness of breath was also a common symptom. Ashmead¹²⁸ thinks that the telluric infection is probably a cause of kakké; that it does not develop, like beriberi, upon the ocean, but that there are other important factors, such as overcrowding and the lessened skin resistance of the Japanese. It seems to effect hairy persons the least. The neuritic symptoms are generally symmetrical. He considers the affection as probably due to some alteration in the blood-vessels from a bacillus. Pettus¹²⁹ reports 5 cases of beriberi from the Marine Hospital at Chelsea, Mass., occurring in sailors who had been in Africa, Central America, Singa-

pore, and South America; and Crandall ⁵⁹_{Oct. 10} reports 5 cases from a Brazilian vessel. In Pettus's cases the symptoms were: pain, swelling of the legs, weakness, loss of knee-jerk. One of them died suddenly. Melendez ⁹²⁵_{Mar.} contrasts malignant dropsy and beriberi. Dropsy is less infectious and attacks exclusively the insane. Paralysis is never observed. The digestive tract is unaffected. The progress is slow, and in an epidemic very few persons are affected, differing in these respects from beriberi.

Lead Paralysis.—Oliver, ²²_{Mar. 11} in the Goulstonian Lectures, discussed lead poisoning in its acute and chronic manifestations. The worst types were found, in his experience, in workers in lead, especially in the smelters and manufacturers of white lead. Drinking-water, fermented liquors, hair-dyes, etc., were also dwelt upon as causes of the affection. Lead is a poison that strikes early at the functions of blood-making and reproduction. A first attack predisposes to a second, a second to a third. The blood-cells are invariably diminished. Colic and alterations in the menstrual functions are among the earlier symptoms. He considered that the primary lesion in lead paralysis was probably central. Experimenting on animals showed that it is difficult to produce lead paralysis in animals, and that some animals are not easily poisoned. Emaciation and a decrease of red blood-corpuscles are constant features. In the liver of animals and lead-workers there was found an intercellular cirrhosis. The renal epithelium underwent fatty degeneration; there was an increase of round-cells about the blood-vessels. Among the first conditions was parenchymatous nephritis, a true interstitial nephritis developing later. Intemperance and the use of alcohol seem to determine the attacks. He does not consider that lead encephalopathy is due to the actual presence of lead in the brain, but to the poisoning of the blood and pronounced anæmia. Nitrite of amyl is commended in the treatment of attacks of acute encephalopathy. Girat ¹⁷_{May}, reports a case of irregular, involuntary movement on the right side, followed by clonic convulsions, with lead poisoning. Bartley ⁶_{May 22} takes exception to Oliver's statement that workers in lead-mines never suffer, having found in Australia that they are very susceptible to lead poisoning. Pagliano ⁴⁶_{July 15} reports a case of facial paralysis due to lead poisoning. Chavanis ²²²_{May 15} reports 2 cases of lead poisoning in men who tested fire-arms, taking up handfuls of shot to load

them, and holding the guns in place by pressing down a heavy lead bar. Potain¹⁴ reports cases associated with hysteria.

Alcoholic Paralysis.—Little that is new has been added to our knowledge of this subject. Kojewnikoff²⁴ gives a general summing-up of our knowledge upon the subject, which is also considered in two lectures by Bruschini,⁵⁶⁹ Apr. 17, Aug. 10 and by Saunders⁵⁷ and Saundby.³² Rummo⁸ considers the pathological changes in some cases of alcoholic paralysis. In the first case the degeneration of the peripheral nerve-elements was very severe and of the type of parenchymatous neuritis. These changes were marked in the nerves of the legs, especially in the more peripheral portions, the spinal cord being intact. In the second case there was a central lesion in the form of beginning sclerosis of the white substance in the brain, with many aneurisms, although the spinal cord was normal. Changes in the nerves were comparatively slight, and of the character of an interstitial neuritis. Friis⁸⁷³ found that in 127 cases of acute delirium tremens there was some rise of temperature. Jogiches⁸⁵⁹ reports a case of diabetic neuritis.

Treatment.—Keldysh⁵⁹⁰ No. 11 found great relief in 2 cases of neuritis from large doses of antipyrin—100 grains (6.48 grammes) a day. Voigt⁶⁹ Apr. 16 commends the use of thermal baths at Oeynhausen.

MUSCLES.

Physiology and Pathology.—Beevor⁴⁷ Spring No. has investigated the action of certain particular muscles, and has come to the following conclusions: 1. Examination of the muscles, when they are visible, in contraction on the living body, gives the most exact results as to their actions. 2. The antagonists of a muscle cannot be observed to contract in violent voluntary movements; in slow moderate movements it is doubtful if the antagonists do more than moderate the fall of the limb by gravity, while in very fine exact movements it is probable that both sets of muscles act together. 3. So far as we know, there is no instance of a muscle producing an action diametrically opposite to its usual action. 4. A muscle of the limbs can be paralyzed for one kind of movement and not for another. 5. This condition would point to the lesion being in the nuclei of the spinal cord or its roots, and not in the peripheral nerves or the muscles primarily. Mendelssohn,⁸ Aug. 12 studying the muscular curves, finds that all the modifications of the

disease may be reduced to four types,—the spasmodic, paralytic, atrophic, and degenerative. Knoll, ⁸⁴ in studying the morbid changes in the muscles, calls attention to an interfibrillary substance which he considers very important in the nutrition of the fibre. There are fibres which are rich and fibres which are poor in protoplasm; the former are thinner than the latter, and are found chiefly in the most active and best nourished muscles. In amphibia and fishes, fat is found in this interfibrillary protoplasm at different times of the year; this fat is found between the fibrillæ, chiefly in the thin fibres, such as those of the heart. A like condition is found in mammals after ingestion of phosphorus, which explains the early affection of the heart in phosphorous poisoning.

Myositis.—Brunon ²⁰⁸ has studied the pathogeny of primary infectious myositis, and holds that it is a morbid manifestation due, probably, to the same general affection as osteomyelitis, and arising from the action of several varieties of microbes, which are probably not of a specific nature. Delorme ³ has found tubercular nodules in the muscles, and in the discussion of his paper Reverdin reported a case of tubercle of the biceps, which was apparently primary. A review of our knowledge of polymyositis is given by Larger, ²¹² and a case of acute hæmorrhagic polymyositis is reported by Prinzing. ³⁴

MUSCULAR ATROPHY.

Muscular Atrophy of Cerebral Origin.—Mouratoff ¹⁶⁴ gives the following conclusions: (1) In cerebro-spinal affections muscular atrophy may be developed without concomitant lesions of the cerebro-spinal ganglia; (2) descending degeneration of pyramidal tract is not essential for development of atrophy; (3) in the great majority of cases atrophy is consecutive to lesions of the motor zone of the cerebral cortex; (4) from an anatomico-pathological standpoint there is, in these cases, simple atrophy; (5) these atrophies are explained more readily by the vasomotor theory than by that of lesion of the anterior horns (anatomical or dynamic lesion).

Progressive Spinal Muscular Atrophy.—Roger ³ has caused a muscular atrophy in rabbits by injection of the streptococci of erysipelas, and in 14 cases he found a systemic myelitis, characterized by a degeneration of the cells of the anterior horns, the peripheral nerves being intact.

Donkin ⁴⁷ reports 3 cases of the peroneal type of muscular

atrophy,—a father, son, and daughter,—where there were no fibrillary contractions, but where the muscles did not respond to either current. In both cases the arms also were affected.

Krauss¹⁷⁰ gives the results of a pathological study of muscular atrophies. The pathological conditions he considers are simple degenerative atrophy, where the fibres are split up into longitudinal fibrillæ and gradually disappear; in other cases fatty degeneration may occur, and the fibre then has the appearance of a sheath containing a clear material with some fat-globules. The intensity of this process is not the same throughout the muscle; patches of healthy fibres may be found surrounded by others in different stages of atrophy. Proliferative changes occur in the nuclei of the muscular fibres, and may lead to a new cell-growth within the sarcolemma, replacing the contractile substance. Proliferation of the interstitial tissue also occurs, and to such an extent as to separate the neighboring fibres. The entire muscle may, in fact, be converted into bands of connective tissue, with some fat-globules interposed between the separate layers. (See colored plate, No. II, Fig. 7.) In the fatty infiltration of the fibres, which is less common (No. III, Fig. 7), hyperplasia of the interstitial connective tissues and fatty infiltration follow closely upon the wasting of the muscle, and cause no decrease but a slight increase in the volume. Round, yellowish cells, with here and there an intact muscular fibre, may be observed. In the accompanying plate (Fig. 7), I represents normal muscle-fibre; II, atrophy, connective-tissue proliferation; III, atrophy, fatty infiltration; IV, atrophy of cells in anterior cornua. Krauss also gives a classification of the different forms of muscular atrophy, which, however, contains nothing new. Sawtelle⁹⁹, reports a case of muscular atrophy in which there was also a bronzed skin. Schultze⁹⁹, describes a case of what was apparently spinal muscular atrophy, which was cured in six weeks by suspension.

Muscular Dystrophy.—The most important and valuable contribution to our knowledge of this subject is the exhaustive treatise by Erb,¹⁰⁰⁵ who claims priority in considering the muscular dystrophies. These he classes under four different types: the juvenile, the pseudo-hypertrophic, the infantile, and the hereditary forms. The juvenile type begins in the muscles of the shoulder-girdle, affecting the muscles of the shoulder and upper arm and

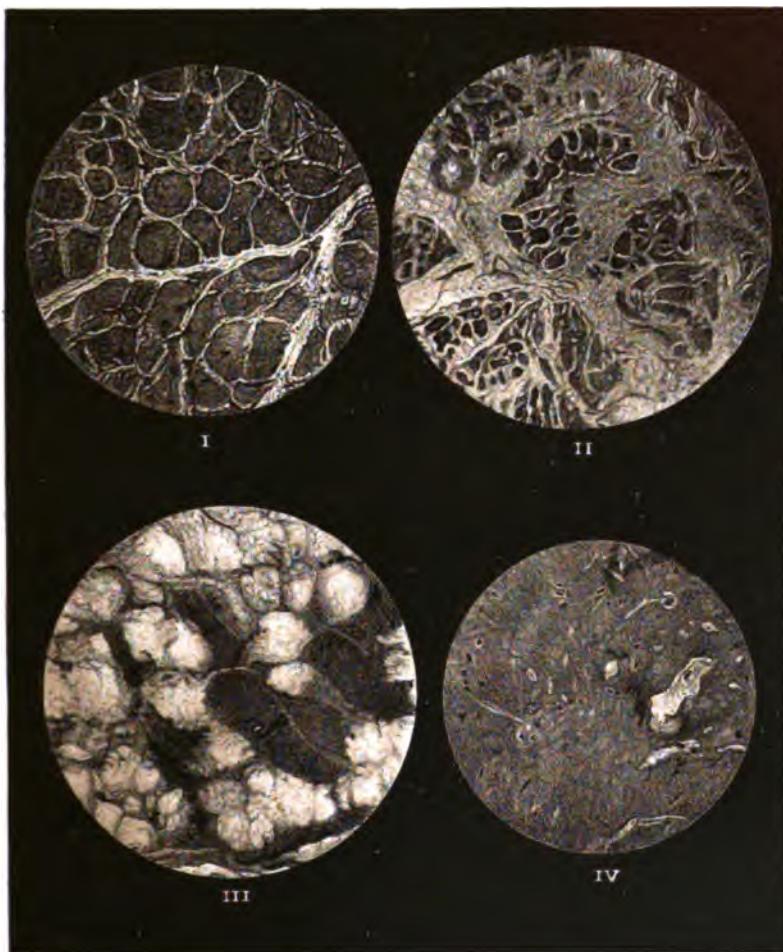
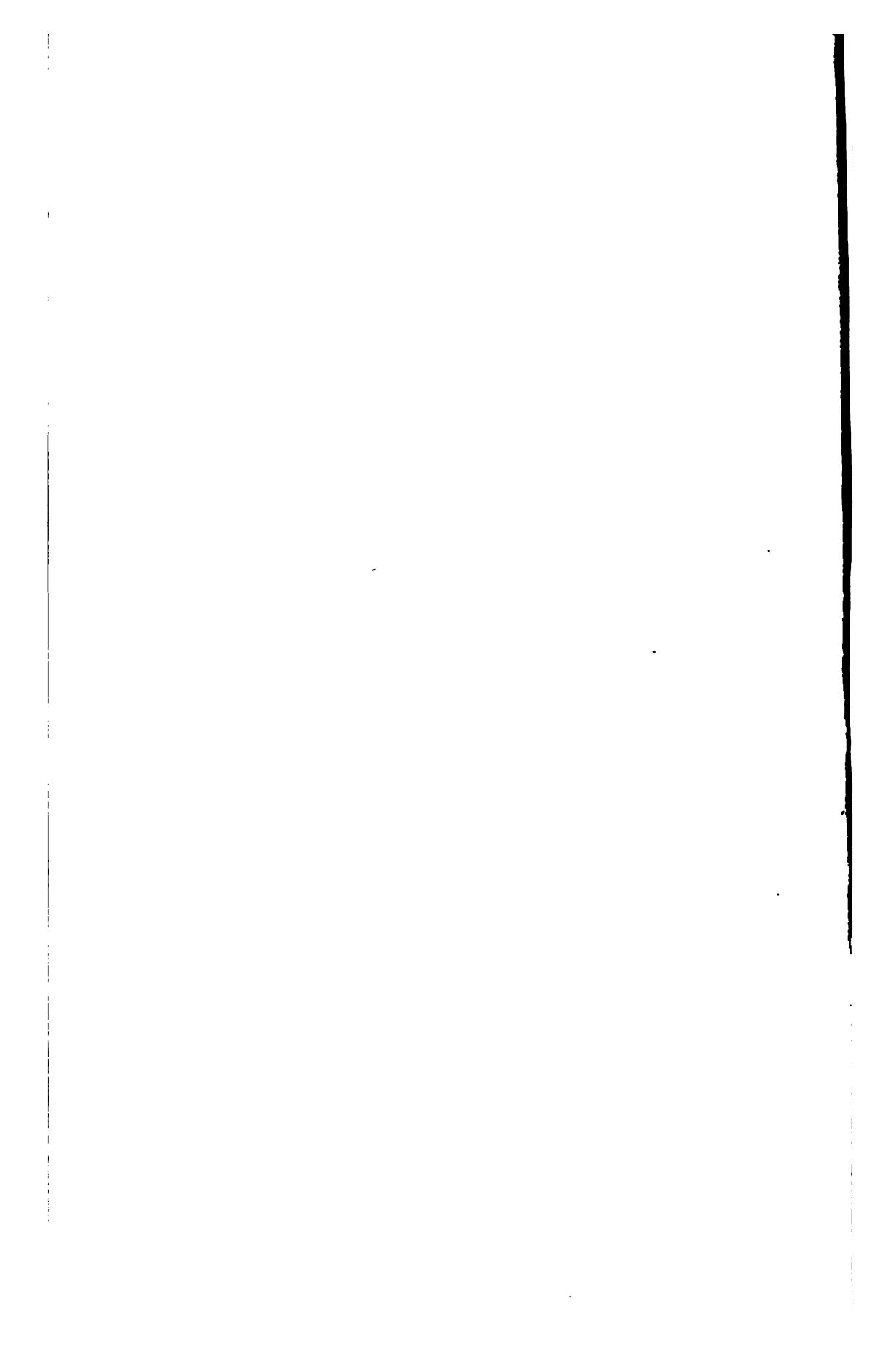


Illustration of Muscular Atrophies. (Krauss).

- I. Normal fibre.*
- II. Atrophied muscle.*
- III. Fatty infiltration.*
- IV. Cavities in the gray matter of the cord.*

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sparing those of the forearm; with this is usually associated a hypertrophy of some muscles. It begins in youth. The infantile type is that first described by Duchenne, affecting the muscles of the face as well as those of the shoulder and upper arm. The hereditary type is marked by its heredity, and is more apt to involve primarily the muscles of the legs. Erb shows, however, that these forms coincide in their manifestations. in the characteristic disturbances of movement, in the occurrence of hypertrophy in definite muscles, in the absence of fibrillary contractions, and in the retention of mechanical and electrical irritability. Furthermore, in all forms heredity is manifest, and mixed forms are not infrequent. In the juvenile form the face may later become implicated as well as in the pseudo-hypertrophic. The infantile form may be associated with pseudo-hypertrophy or with the juvenile form. Pseudo-hypertrophy may have a juvenile localization later; and other cases occur which cannot be classified under any of these forms. Furthermore, two or more different forms may occur in the same family. He considers the anatomical lesions from excisions of the muscles and from autopsies. These investigations show that in all forms there are hypertrophy and atrophy of the fibres, increase of their nuclei, the formation of vacuoles, increase of the nuclei and hyperplasia of the connective tissue, thickening and increase of nuclei in the walls of the vessels, an increased deposit of fat, and division of the fibres. Distinctions in these details occur; but they are found as well in one and the same case as in the different types. Erb thinks, moreover, that with our present methods of research the negative lesions in the nervous system are the rule; but, of course, changes in the nervous system may occur. The different forms of muscular atrophy belong together; they form one morbid group, one morbid entity, which can best be termed progressive muscular dystrophy. The morbid process is considered to be somewhat as follows: The affection begins with changes in the muscular fibres, which first hypertrophy, the nuclei increase, the fibres become round and divided; then there is probably a slight increase of nuclei in the connective tissue, and a slight proliferation. Further, there is a progressive atrophy of the fibres, with increase of nuclei and the formation of vacuoles and fissures, which lead to a complete disappearance of the fibres. Then there is a marked hyperplasia of

the connective tissue, with a great increase of nuclei and thickening of the vessels; sooner or later fat-cells develop in this tissue, leading finally to lipomatosis; the final result is a complete disappearance of the muscular tissue, and instead of it an atrophy,—sclerotic or a pseudo-hypertrophic lipomatosis. The process probably begins in the muscular fibre itself, the hypertrophy being an active pathological process and one of the earlier changes. The changes in the muscles differ from those in the degenerative atrophies. The changes in the nervous system are the exception, but certain factors point to central localization, among these being heredity, the localization of the affection in definite muscular groups, and the occurrence of other nervous disturbances in patients with dystrophy, such as idiocy, hemicrania, and epilepsy. Hence, Erb returns to the theory that dynamic changes in the central nervous system produce the atrophy. In a few cases of dystrophy reaction of degeneration is seen; but, as a rule, both it and fibrillary contractions are absent. He has never seen either. Finally, Erb classifies the form of progressive muscular dystrophy as follows: 1. Progressive muscular dystrophy of infants. A. Hypertrophic form (*a*) with pseudo-hypertrophy, (*b*) with true hypertrophy. B. Atrophic form (*a*) with primary implication of the face, (*b*) without primary implication of the face. 2. Progressive muscular dystrophy of youth and adults.

Rott²⁴ comes to somewhat different conclusions from Erb, as follows: (1) the existence of a progressive muscular atrophy not dependent on lesions of the nervous system may be considered as demonstrated; (2) the muscular lesions consist of an atrophy of the transverse and longitudinal muscular fibres; (3) hypertrophy of the fibres is a compensatory phenomenon, and is not referable to the pathological process; (4) heredity being the only etiological factor that has been proven, the primary cause of the affection must be sought for in the modification of that part of the fecundated ovum which enters into the formation of the muscular system. Hammer²⁰⁸⁵ describes various cases of dystrophy, one of them being a case of Erb's juvenile form, with implication of the face, where a brother had pseudo-hypertrophy. Two other members of the family probably had muscular dystrophy, three had had apoplectic seizures, and one had tabes. Israel²⁰⁸⁶ reports a case of dystrophy of the juvenile form, where the thighs were hypertrophied.

Other cases are reported by Dähnhardt,⁷⁵ Werdnig,³⁸⁸ Stembo,²¹ Klebs,⁶⁸ Calderai,⁵⁸⁹ Freyhan,¹¹⁴ McPhedran,³⁹ Senator,⁴ Kobler,²⁴² Ness,²¹³ and Rédard and Rémond.³⁹⁰ In these last cases there were fibrillary twitchings and reaction of degeneration, yet there was also distinct enlargement of the calves. Marie⁸ presented a case of myopathy, with a remarkable deformity of the skull, where the transverse diameter was larger than the anterior posterior diameter. He had seen other cases of dystrophy where there was a high cephalic index, although not as great as this. He thinks this a phenomenon inherent in progressive myopathy, possibly due to an osteomalacia and prolonged stay in bed. Gombault,⁴⁵⁷ in a case of juvenile dystrophy, found some degeneration in the spinal cord and an absence of axis-cylinders in a number of fibres in the peripheral nerves, the atrophy, perhaps, being due to a neuritis. Guinon and Souques,⁷ have found, in a certain number of cases of myopathy, a deformity of the thorax. In consequence of the atrophy, the patient was confined to bed for several years. There was a double deformity in the two diameters of the thorax, a notable diminution in the antero-posterior diameter, and a displacement in mass of the thorax laterally, the median line of the sternum no longer corresponding to the axis of the body; this was thought to be due to the prolonged lateral decubitus. Déjerine,⁸ has called attention to a similar deformity.

Henry²⁴² reports a case of peculiar enlargement of the muscles, beginning in a circumscribed fashion in a patient who probably had myxœdema, which he terms myxœdemoid dystrophy (paratrophy). Schultz,⁶⁹ reports a case of circumscribed enlargement of the muscles, which was possibly a fibrous myositis.

Neurotic Atrophy.—Various cases of what were termed by Hoffmann progressive neurotic atrophy have been described in the last year, notably by Hoffmann¹⁰⁰⁵ himself, and Hänel,²⁰⁸⁷ Baehcherdt,⁷⁶ and Stembo.²¹ A distinct separation of these cases on account of the situation of the atrophy seems, however, not to be possible; for, besides forms beginning in the leg, as described originally by Tooth, others occur. Hoffmann describes 2 cases which began in the hands in children, and others of a hereditary type.

Muscular Atrophy in Joint Disease.—In last year's ANNUAL, vol. ii, C-7, Raymond's investigations on muscular atrophy secondary to joint disease were noted. Duplay and Cazin³⁸⁰ have been making

further experiments upon animals by the injection of irritating substances into the joint. The muscles always showed a loss in weight, usually in proportion to the duration of life. In 1 traumatic case examination showed a simple atrophy of the muscles, with all the nerves healthy except in the branches actually involved in the joint, where there was a diminished number of fibres, a few of which were degenerated. The spinal cord was normal. The predominance of the changes in the extensor muscles may be explained by the relation of their nerves to the nerves supplying these vessels. The writers assume, however, an intervention of the cord; the atrophy being explained by a simple reflex set up by the irritation of the internal filaments of the nerves. Cases of atrophy following joint disease are reported by Perregaux²¹⁴ and Dark-schewitsch.⁷⁵ In this case the muscular fibres were considerably smaller, but there was no trace of degeneration and no alterations of the vessels or nuclei. Fournier²²⁰ reports a case of dry arthritis associated with pseudo-hypertrophic paralysis.

MUSCULAR SPASM.

Muscular Contractures.—Terrillon⁴⁵² advocates, in the treatment of muscular contractures, tenotomy and forced movements. Krukenberg⁶⁹, puts the affected limb in a splint, which is connected with a heavy pendulum, and the movements of the pendulum thus convey a progressive movement to the joint, and gradually overcome the contractures. Barrs⁹⁰ reports a case of syphilitic neuritis, with permanent contraction of the ring and little fingers.

Dupuytren's Contraction.—The only case reported which has any particular interest is one by Kingsbury,² in which he claims a cure from hypnotism; but the diagnosis seems uncertain, and passive movements as well as hypnotism were employed. Adams² reports cases of contractions in the fingers, beginning in young children and associated with hammer-toe.

CONVULSIVE TIC AND MUSCULAR SPASM.

Osler^{9,10} reports a case of that form of convulsive tic, associated with coprolalia, first described by Gilles de la Tourette, and points out the occasional association of this affection with forms of the insanity of doubt. A case is also reported by Stembo.⁴ Kahler²² describes a case where the whole body was

in a state of unrest, with contractions of the muscles of the neck, extending to the back and abdomen and in a slight degree into the limbs and face, which he regarded as a form of convulsive tic. Du Cazal²⁷⁵ reports 2 cases of spasm of the neck, 1 of which was associated with some symptoms resembling insanity of doubt. Upshur⁸¹ reported to the Richmond Academy of Medicine and Surgery a case of general trismus from indiscretions of diet. Shaw¹⁰⁹ had a case of facial spasm, due, as he thought, to a scar upon the neck. Von Bergmann⁶⁹ reports a case of clonic spasm of the ileo-psoas. Vizioli⁶⁵² had a case of permanent tonic spasm of the masticatory nerve of Bell, which was unilateral and was thought to be of cortical origin. Lewis²⁴² relates a case of spasm of the muscles of the neck, in which both sterno-mastoids and both spinal accessory nerves were removed, with only slight benefit; and Hughes⁹⁸ a case of rhythmical spasm of one sterno-mastoid. Kueger¹¹⁸ has relieved partial spasms by hot applications. Leszynsky¹ reports one case of spasm of the platysma which was cured, and a case of facial spasm which was greatly relieved, by subcutaneous injections of atropine.

PARAMYOCLONUS MULTIPLEX.

Unverricht²⁰⁰ has published a monograph upon the subject, giving a careful review of our present knowledge and reporting 5 cases. The characteristic feature of the affection, he thinks, consists in the form of contractions. They are lightning-like, often isolated, rhythmical, and occur in muscles of different functions. No voluntary muscles, except those of the eyes, are free from the contractions, which cease during sleep. An effort of the will diminishes, but emotion or excitement increases them. If they are great they may lead to involuntary movements of the extremities. The distinction from hysteria is especially important. The chief point is that in hysteria muscular contractions always occur in groups of muscles which work together, and a pathological spasm is not to be regarded as hysterical unless it can be spontaneously caused by a voluntary effort. In myoclonia the contraction affects muscles which do not act together. Unverricht thinks the most plausible theory for the pathology of the disease is that it is due to an irritation of the motor cells in the anterior horns. Recovery is doubtful, but chloral seems to give temporary relief. Cases are also reported

by Peiper, ⁸⁰ Melotti, ⁸¹ Simon ¹⁶⁴ (who gives a case which was probably due to injury), and Boulay. ¹⁰⁰

PROFESSIONAL CRAMPS.

Féré ³ describes a case of writers' cramp coming on only after protracted use of the muscles, but coming on spasmodically in a way to suggest an epileptic seizure; on one occasion the patient also bit his tongue. The affection was relieved by bromide. Rivers ⁷ reports a case of treadlers' cramp in a weaver who worked the treadle chiefly with his right leg. Suckling ² saw a case of hammer paralysis in a tool-maker. De Agostini ⁶⁵⁵ reports 2 cases of fissures occupying the inner side of the extremity of the fingers, excluding the thumb, in persons who played the piano very violently and very badly, which he considers due to the faulty method of playing.

Predtetschenski ⁵⁸⁶ has found a curious affection in reapers after prolonged labor. They have pain in the left forearm and hand which renders them incapable of work. On the dorsal surface of the arm, a little above the wrist, is found a slight swelling which is very sensitive and sometimes reddened. He considers the trouble due to an affection of the tendons of the thumb-muscles. It gets well in a few days if the patient rests, but it is apt to recur when he resumes work. Von Zander has made a careful study of drummers' paralysis, which was described in last year's ANNUAL, vol. ii, C-63. He has collected 22 cases, in 19 of which there was extensor paralysis and in 3 flexor paralysis. He considers the frequent atrophy of the intrinsic thumb-muscles due to pressure of the drumstick, and not to the disease. Inflammatory conditions are common. He regards the condition as due to overexertion and as incurable. Weiss ¹⁶⁰ claims considerable benefit from electricity in writers' cramp. He uses galvano-faradic massage and stabile galvanism.

ATHETOSIS.

Little that is new has appeared on this subject. We need merely mention cases reported by Chavanis, ²²⁸ Mar. 15 Faille, ⁵⁷⁷ Dec., '90 and Scheiber. ⁸⁶⁸ No. 1, '90

PARALYSIS AGITANS.

Von Sasse ²¹ reports a case of paralysis agitans, where there was an increase of tremor during voluntary movements. The

autopsy showed a partial obliteration of the cerebro-spinal canal, abundance of corpora amylacea in all portions of the cord, and some arterio-sclerosis, but there was no degeneration in the nerve-fibres of the cord, although the connective tissue was increased; the peripheral nerves and muscles showed decided alterations. In the brachial plexus there were seen thickening of the perineurium and endoneurium, a diffused proliferation of connective tissue, with increase of nuclei; atrophy and partial disappearance of nerve-fibres, with coagulation of myelin and thickening of the blood-vessels. In the muscles the fibres had everywhere undergone some atrophy, so that they appeared smaller than normal, and the sheaths were crowded with nuclei—evidently a chronic myositis. The author thinks that the neuralgic pains may be due to an actual neuritis, and calls attention to the fact that, with very few exceptions, the nerves and muscles have not been examined in the autopsies on these cases. Borgherini⁵⁰¹ has continued his researches upon the pathology of *paralysis agitans*, which were described in last year's ANNUAL, vol. ii, C-70. The most marked changes consisted in trophic lesions of the nerve elements with marked alterations in the smaller arteries of the capillary system, involving not only the smaller arteries supplying the nerve-centres and the muscular system, but the *vasa vasorum* of the larger vessels. He regards the changes in the vessels as the principal elements in the pathology of the disorder; the first change being an alteration in the capillary system, which was followed secondarily by changes in the nerve elements and the interstitial tissue. These lesions correspond quite closely to those of senile involution, and he holds that *paralysis agitans* represents probably a premature senility of the nervous system. Bordoni⁵⁸⁹_{Agit.} has studied the tremor in *paralysis agitans*, finding that it is regular in its rhythm, but the intensity of the oscillation undergoes rhythmical variations. This periodicity increases from morning until noon and then decreases toward evening. It is more marked when the patient is quiet and in cold weather, and diminishes after food, alcohol, motion, and muscular fatigue; it was notably diminished also after using tobacco. Bernabei⁵⁸⁹_{Agit.} has also studied the tremor, finding exaggerations from different causes. It was less marked when lying down than when standing, and during the execution of voluntary movements it was

temporarily arrested, the arrest being followed by exaggerations. This arrest and subsequent exaggeration were also noted after sensory stimulations. Bidon⁹² noted in 1 case, after influenza, that the attitude of the patient was completely changed. Before the attack, the patient represented a typical case of spasm of the stooping type; after the attack, the legs, feet, and body were extended, although the head was still bent forward. Hadden⁴⁷ reports a typical case, beginning at the age of 25. Moncorgé²¹¹ states that paralysis, with or without atrophy, may occur at the beginning, in the course, or in the later stages of paralysis agitans, and is to be attributed to the disease itself, and not to any complications. He is disposed to class paralysis agitans as a neurosis. Galezowski³ has studied the ocular symptoms in paralysis agitans; they consist of a drooping of the upper lid, accompanied by convulsive tremor, fixed look, and temporary amblyopia, without any changes in the eyes themselves. In 1 case there was a diminution of the field of vision, both inward and downward, affecting only one eye. Cousin¹⁸⁸ reports a case without tremor; and a clinical lecture upon the subject is given by Déjerine.⁸

HEREDITARY TREMOR.

Debove¹⁰⁰ gives various histories of families where hereditary tremor has been marked. The oscillations were rapid (eight to nine a second), ceased during complete rest, and affected chiefly the upper extremities. A similar family history is given by Lieber.²²⁰

TETANY.

The most important contribution to this subject is a monograph by Frankl-Hochwart.²⁰⁸ In this he has made a careful study of the entire subject, for which his previous contributions, already mentioned in the ANNUAL, have thoroughly qualified him. He considers the affection, as it occurs in healthy individuals, and in those suffering from gastro-intestinal affections, acute infectious diseases, from the effects of various poisons, such as alcohol, purgatives, chloroform, etc., and in pregnant and parturient women, nursing children, and, finally, tetany after extirpation of the thyroid. He points out, furthermore, the greater prominence of the attacks in the months of March and April. He believes that the affection is probably, at least in part, an infectious disease from its

epidemic-endemic onset, and the fact that it frequently begins with febrile symptoms. The section on the pathological anatomy of the disease shows rather our defective knowledge than anything else. The author considers that the most constant changes have been found in the spinal cord. The important factor in treatment is rest. Wagner²² has produced experimental tetany by removal of the thyroid in the cat. Wolfler had failed to obtain such results in the dog; and he points out that, in the 46 cases of total extirpation in human beings, 70 per cent. were free from tetany. In cases where tetany becomes chronic, there is slight myxœdema; and it is an acknowledged fact that, there is some relation between myxœdema and tetany. He is also inclined to believe that, after extirpation of the thyroid, tetany can be relieved by a vegetable diet.

Escherich,⁸ from observation of 30 cases, thinks that laryngeal spasm should be considered as an essential clinical feature in tetany, especially when it occurs in rachitis, and that its presence renders the prognosis graver, as, in that case, it may be necessary to perform intubation or tracheotomy. Bernhardt⁴ has called attention to the great variation in the distribution of this disease in Germany, the greatest number of cases having been observed in Vienna and northern Germany. Möbius has not seen a case at Leipzig in fourteen years; von Jaksch has seen very few at Prague; Weinberger, physician to the Shoemakers' Union of Vienna for many years, has not seen a case in a person fresh from the country, although one-half the patients suffering from tetany are shoemakers; Stewart, in reporting a case in 1889, stated that it was the sixth case published in America. Tetany forms seven-tenths of 1 per cent. of all cases at the Vienna Dispensary for Nervous Diseases; hardly one-tenth of 1 per cent. of all cases in Mendel's polyclinic at Berlin. Bernhardt reports 3 cases found in Berlin. Hoffmann,³⁴ in studying the symptoms of tetany, has noted very marked rapidity of the pulse and, in a case following extirpation of the thyroid, the development of double cataracts. He disagrees with Frankl-Hochwart's experiments, mentioned in last year's ANNUAL, vol. ii, C-65, claiming that pressure upon the vessels is important in causing an attack. He reports another case following extirpation of the thyroid, in which, after some time, symptoms of myotonia appeared. He also calls

attention to the hyperesthesia of the acoustic nerve, which is confirmed by Chvostek ²² from a study of 17 cases. Janchen ⁹²³ reports 2 cases, in both of which there was a diminution of the electro-muscular irritability. Cases are also reported by Felsen-thal, ¹⁵⁸ James, ³⁶ Small, ¹⁰ and a review of the symptoms are given by Park. ¹⁷⁰

THOMSEN'S DISEASE.

Raymond ⁵⁵ reports 2 cases of the disease, in which the muscles of the eye were involved. When the head and neck were turned suddenly there was a spasm of the lids which made the eyes prominent, the gaze fixed, and at the same time caused amblyopia, or even temporary blindness; some of the external muscles of the eye were enlarged. The failure of vision was thought to be due to disturbances of circulation, due to compression of the eye by contraction of the motor muscles. Mills ¹⁰¹³ reports an interesting case, where the patient, who was 40 years of age, had slight indications of the disease at the age of 10. In this case the speech was affected. In another case there was an association of athetosis and tonic spasm, any attempt at voluntary motion producing extreme spasm of the muscles. This came on after sun-stroke, and was supposed to be due to a lesion of the brain. Deléage ²⁰⁸⁹ has written a thesis upon the subject, which, however, contains comparatively little that is new. Seifert ⁷⁵ also reports a case.

MORVAN'S DISEASE.

In last year's ANNUAL (vol. ii, C-40) a considerable space was devoted to the consideration of this affection. In the last year, little that is new has been added to our knowledge of the subject. Bernhardt ⁶⁹ reports a case in a man of 48, beginning with pains in the shoulder and pectoral. This was followed by loss of power in the right arm and profuse sweating on the right side; there was also scoliosis. The sensibility of touch, pressure, pain and temperature were all diminished. Bernhardt concludes that the symptoms may vary very distinctly in syringomyelia, and he does not consider the existence of tactile anaesthesia as a conclusive distinction between this and Morvan's disease. He thinks, however, that clinically the so-called Morvan's disease cannot be separated from the symptom-complex of syringomyelia; that, so far as pathological data exist, lesions of the spinal cord have been

found in both. These lesions are not necessarily of the same nature, but they have probably the same seat, and run a chronic course. Furthermore, disease of the peripheral nerves is a common complication in both affections. Jumon¹⁵² gives a brief *résumé* of the subject, containing, however, nothing new. Church⁶¹ reports a case in this country of a Swede, 35 years of age, who, ten years before, began to have scoliosis. Not long after, he had a felon, attended with great pain; and, four years later, inflammation of the wrist. Three years later he had a similar felon on another finger of the right hand, and, finally, a third finger was affected. The muscular power was diminished, the tactile sensibility was normal, but the sensibility to temperature and pain was distinctly diminished; the knee-jerk was somewhat pronounced. The case is of interest as showing the absence of any tactile anaesthesia in what otherwise resembles the cases of Morvan's disease. A case is also reported by Roth and Czerny.¹⁰²

ACROMEGALY.

Maisonneuve⁷³, calls attention to the eye symptoms of acromegaly. In the cases studied, there was marked exophthalmos, with long, thick, bronzed upper eyelids, with pupils which reacted very slowly to light, but normally to accommodation. The general movements of the eyes were slow, and in raising them there was marked want of synchronism with movements of the lids. The retina showed venous congestion. These movements were attributed to compression of the chiasma and optic tracts by an hypertrophied pituitary body, such as has been found at various autopsies. Gauthier,⁷⁸ in reporting a case, divides the affection into two stages. The first he terms the erethic stage, with symptoms of hyperæsthesia, hypertrophy of the muscles of the heart, polyphagia, polydipsia and polyuria; the second, the cachectic stage, the symptoms being muscular atrophy, nose-bleed, and dilatation of the heart. He is disposed to classify the disease as an angiomatosis, with myxœdema and exophthalmic goitre.

Arnold⁷⁶⁸ reports a case, with autopsy, in which he found, in the head, only a thickening of the alveolar processes of the upper jaw. There was kyphosis and thickening of the bones of the shoulder-girdle. The bones and skin of the hands and feet

were thickened. The thyroid gland was not abnormal. There was degeneration of the muscles, increase of connective tissue of the skin and of the sheaths of the peripheral nerves; there was also endarteritis of the smaller vessels. The increase in size of bones was due chiefly to periosteal new growth; the hypophyses were not enlarged. He regards the most characteristic lesion of acromegaly as a symmetrical thickening, increasing toward the projections; and he thinks that "pachyacria" would be a more suitable term, since megaly implies also an increase in length.

Holsti²⁰² reports a case, with autopsy. The skull was very thick, the brain large, the hypophysis much enlarged; the long bones were not affected; the bones of the hands and feet were enormously increased in size, chiefly in the terminal phalanges, but the joints were intact. Section of the bones of the affected members showed that the compact substance was much thicker than ordinary; the thyroid gland showed marked thickening of the connective tissue, with atrophy of the glandular parenchyma. The author compares acromegaly with other diseases attended with changes in the thyroid, but thinks that various affections have been confused under this name.

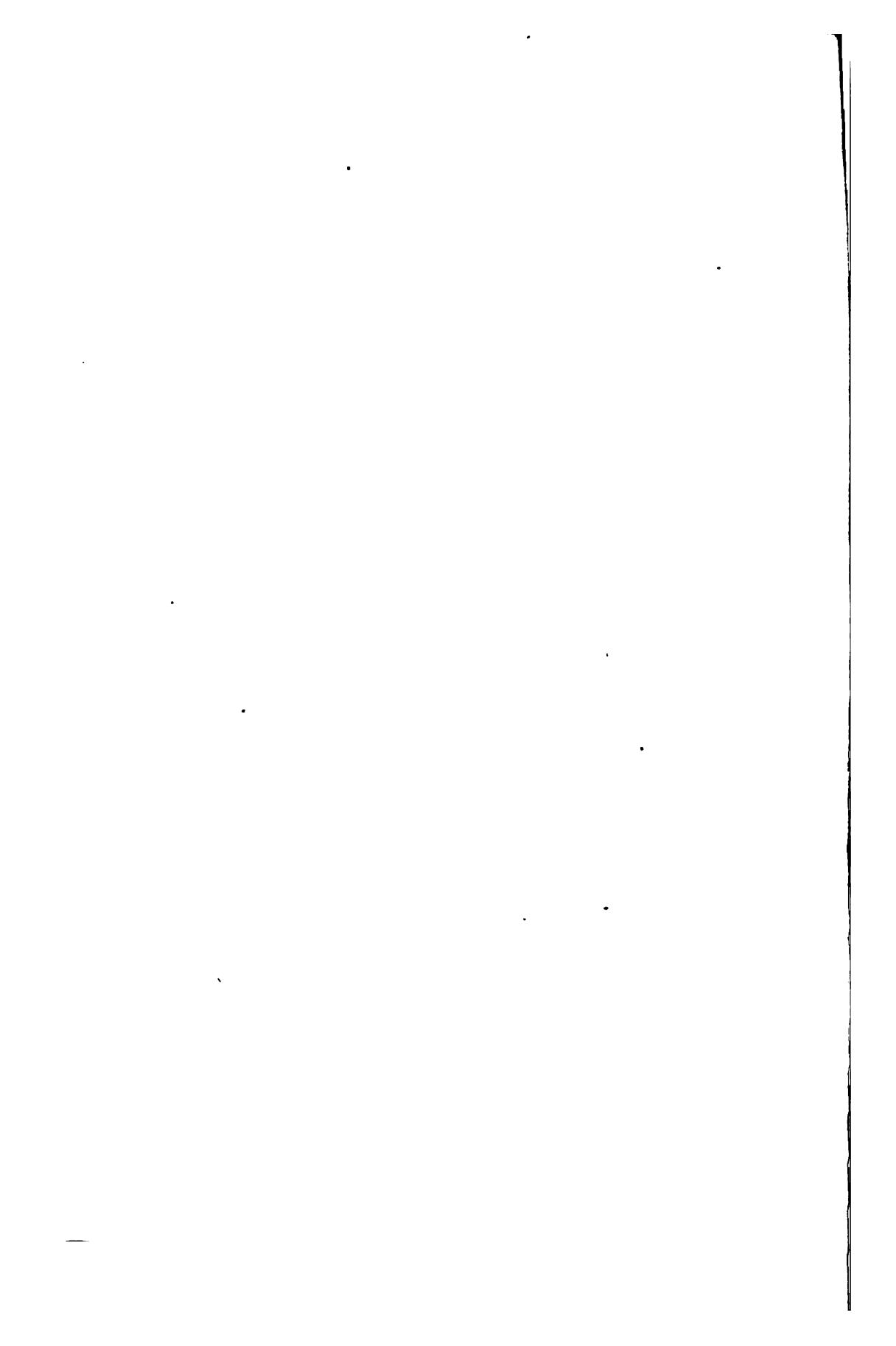
Cheron¹⁷ gives a general review of the subject, which contains little that is new. Gerhardt¹ also reports a case associated with some rheumatic conditions.

Cénas²²⁸ describes a remarkable case in a boy of 15. At the period of birth a marked asymmetry of the face was noticed. Some months later the hands were noticed to be malformed. At the age of 4 there were pigmented spots upon the hands and feet, and at the age of 7 it was noticed that the hands and feet had increased steadily, but the arms and legs had remained slight. The ability to use the hands was apparently impaired. The head was enlarged and unsymmetrical; the hands were covered with large violet spots, and, with the feet, were enormous, but the arms and legs were distinctly small; the tongue, cheek, and lips were unsymmetrical. (See colored plate, Fig. 8.) There was a hypertrophy of the lower jaw; the teeth were very large, there was some kyphosis. In spite of the very early onset, the affection was regarded as acromegaly.

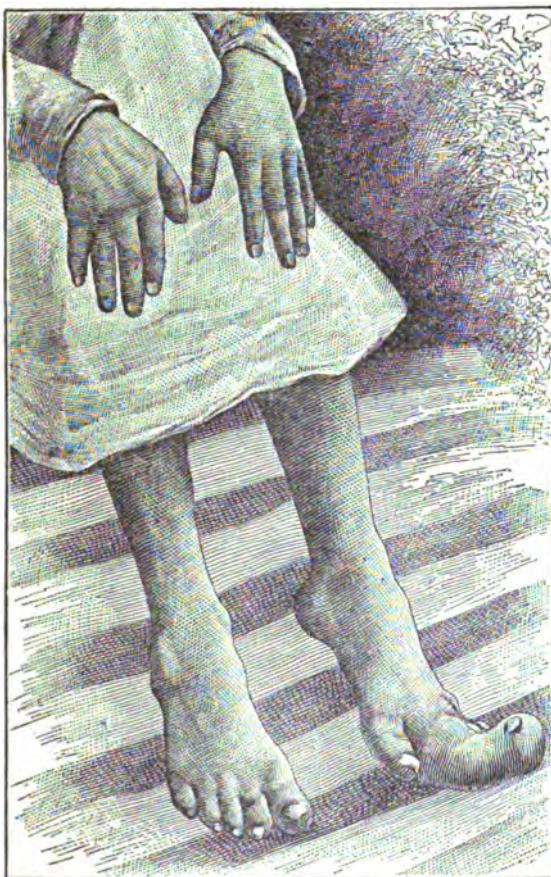
Berkley⁷⁶⁴ reports a case, in a negro woman aged 60, associated with delusions of persecution, and attended with sternal dull-



Supposed Congenital Acromegalia. (Cénas.)
La Loire Médicale.



ness, enlargement of the clavicles, scoliosis, and enlargement of the nose, the cheek-bones, and slight enlargement of the lower jaw. The hands and feet were enormously increased. Cases are reported by Ruttle, ²² Redmond, ⁶¹ Hutchinson ⁸⁰⁶ (three cases), and Long. ⁷⁸⁷ Cases are also reported by Rerner, ⁵⁷⁹ Pick, ⁸⁸ Flemming, Silcock and Campbell ²⁰⁹¹ (two cases), and Pel, ⁴ whose case



KANTHACK'S CASE OF ACROMEGALY.
(*British Medical Journal*.)

apparently came on as a result of fright. Cases are also reported by Du Cazal, ³ Kanthack, ² in whose case the disease began in the left foot, of which the second toe was most enormously enlarged (see cut); by Somers ¹⁴⁷ and Bury. ⁹⁰ In Bury's case the autopsy showed a large glioma of the hypophysis, and each lobe of the thyroid was enlarged and contained a cyst.

HYPERTROPHY.

Thomson² reports a case of very marked hypertrophy of the bones of the left side of the skull, stopping very abruptly at the median line. The bones were enlarged in every direction; there was also a condition of nodular thickening of their surfaces, and bony alteration followed distinctly the area of distribution of the fifth nerve. The patient was an insane epileptic, but there were no special local symptoms. Demme⁶⁵⁰ describes a remarkable case of congenital hypertrophy of the muscles of one side of the body. The left side of the cheek was larger than the right; the left half of the tongue twice the size of the right, and the organ was never withdrawn into the mouth. The child was found suffocated in bed, apparently choked by the enlarged tongue. The autopsy showed that the asymmetry involved the skull, but no other bones. Examination of the muscles showed increased diameter of the muscle-fibres on the affected side, absence of cross-striping, granular degeneration, decrease of interfibrillar tissue, increase in the nuclei of the sarcolemma and embryonic cells in the connective tissue between the muscle-bundles. Neither the nerve-endings nor the peripheral nerves appeared to be affected, but it was thought that there was an increased number of ganglion-cells in the anterior horns on the left side. Du Castel³ reports a case of hypertrophy of the left hand, probably congenital. Richardière³ believes that there are two varieties of such hypertrophy,—one, a true hypertrophy, affecting all parts of the hands; the second, a false hypertrophy, due to an abnormal development of the cellular subcutaneous tissues. The latter does not affect the length of the hand. He showed a case of the second variety, which was of congenital origin.

FACIAL HEMIATROPHY.

Nothnagel⁵⁷ reports a case of atrophy of the left side of the face without paralysis or vasomotor symptoms; there was marked tenderness of Valleix's points. The tongue, palate, and muscles of mastication were also affected, and there was typical trigeminal neuralgia. Nothnagel discusses the pathology of the affection, and divides the cases into those of simple atrophy without other symptoms, those with vasomotor symptoms, and those associated with pain. The latter, he considers, are distinctly due to a peripheral neuritis. The cases with vasomotor symptoms may possibly be

associated with disturbances of the sympathetic. Jankau ¹⁰⁰ reports a case of facial hemiatrophy, associated with enlargement of the thyroid gland, but he is uncertain whether any significance is to be ascribed to this complication. Borgherini ⁸³⁴ relates a case in which the disease began upon the right side and gradually extended beyond the median line. There was complete anæsthesia in the distribution of the two upper branches of the fifth pair and a marked diminution of sensibility in the region of the lower branch. He considers the primary lesion a degenerative alteration of the nerve-fibres, especially of the fifth pair. Muratow ⁵⁸⁶ reports a case associated with spasm of the muscles of mastication. Cerenville ¹⁹⁷ and Popow ⁶⁸ also report cases. Girard ¹⁹⁷ has produced hypertrophy of the face, with atrophy of the muscles of mastication, thinning of the skin, atrophy of the bones and tongue in dogs, by cutting through the sensory portion of the trigeminus in the skull. He considers, therefore, that the trophic fibres for the face are to be found in the main trunk of the fifth nerve. Kalt ³ finds that interstitial keratitis is an occasional accompaniment of slight disturbances in the region of the fifth nerve, and that this change is not due to any anæsthesia.

Lingual Hemiatrophy.—Birkett ²⁸² reports a case of atrophy of the right half of the tongue, paralysis of the right half of the soft palate, and diminished sensibility of the mucous membrane of the cheek and nasal pharynx, paresis of adduction and abduction of the vocal cord on the same side as the lesion, a somewhat quickened pulse, myosis of the right pupil and inflammatory swelling close to the anterior border of the right sterno-mastoid muscle. Pressure on this region caused a flushing of the right side of the face, sweating on that side, and dryness of the throat. He considers the symptoms due to a peripheral neuritis.

RAYNAUD'S DISEASE.

Comparatively little that is new has been added to our knowledge of this subject during the past year. Jacoby ¹ thinks that there are various lesions which may give rise to symmetrical gangrene, and calls attention to the fact that not infrequently a multiple endarteritis is found as a cause. In certain cases of contracted kidney, associated with arterio-capillary fibrosis, symmetrical gangrene may be one of the very early symptoms. Moreover, in every

case of symmetrical or partly symmetrical gangrene, this condition of the arteries should be borne in mind; such a condition may also arise from syphilis, but this endarteritis may occur only in the vessels of the skin. He concludes that a differential diagnosis between Raynaud's disease and anatomical diseases of the arteries can, in many cases, not be made. Sturmdorf⁵⁰ believes that many of the cases upon which Raynaud's hypotheses were based are at present valueless, and that more recent cases frequently show lesions in the vessels or nerves. He concludes, moreover, that many cases are due to endarteritis, which cannot be detected during life, and its absence is a *sine qua non* for the acceptance of Raynaud's disease in the strict sense of the term. Miller⁵¹, reports a case of symmetrical gangrene in the feet, following influenza, due, probably, to the weakened action of the heart, the changes in the blood-vessels and in the blood itself giving rise to the formation of thrombi. Cases are reported, also, by Brown,⁵² Whitton,⁵³ Davidson,⁵⁴ Grubert,⁵⁵ Stonestreet,⁵⁶ and Wedensky.⁵⁷ Grancher⁵⁸, reports 2 cases in children and a case of disseminated gangrene in a child, following vaccination, —due, probably, to an infectious cause.

GENERAL NEUROSES.

Seguin,⁵⁹ in an article upon the early diagnosis of certain affections of the nervous system, dwells at some length upon the diagnoses of nervous affections, dividing them into three groups: positive diagnosis, when the symptoms are clear; probable diagnosis, when some of the capital symptoms are present, though perhaps not marked, and where special knowledge is of particular value; and, finally, diagnosis of possibility, where the course and grouping of symptoms is anomalous, and many of the elements for diagnosis are absent. In ordinary affections there are three kinds of diagnoses: the first, the diagnosis of the symptoms or symptom groups; the second, the diagnosis of the seat of the lesion; and, finally, the diagnosis of the nature of the lesion. In functional and nervous affections we are limited to two diagnoses; the diagnosis of the symptom or symptom-group, and the diagnosis of the patient's general condition and predisposition.

Clouston,⁶⁰ in the Morison Lectures for 1890, dwells upon the disorders of the nervous system which accompany the period

of growth and development. In the course of the growth and development of the brain there are liable to occur certain failures in the attainment of the working standard of nervous and nutritional health, and the resulting defects or diseases may properly be called neuroses of development. They have a natural relation to each other in that they are thus developmental, and, for the ultimate pathology of them all, we must look to heredity. The period of development, that is, the period which the brain requires to reach maturity, covers twenty-five years, and in this period the great factors in the production of disease are age, onset of function, and heredity. The functional and critical ages, such as the crisis of birth, dentition, of the vast increase of brain-weight, etc., are all of importance in the development of disease. We are yet in ignorance of the real causes which determine many of these defects, especially the defects of the embryo. It is probable that various structural congenital defects, such as harelip, cleft palate, spina bifida, and congenital idiocy, arise from defective heredity, but the connection between the bad heredity and the structural defect is unknown. The following is an attempt to classify developmental defects and diseases, most of them being neurotic in origin:—

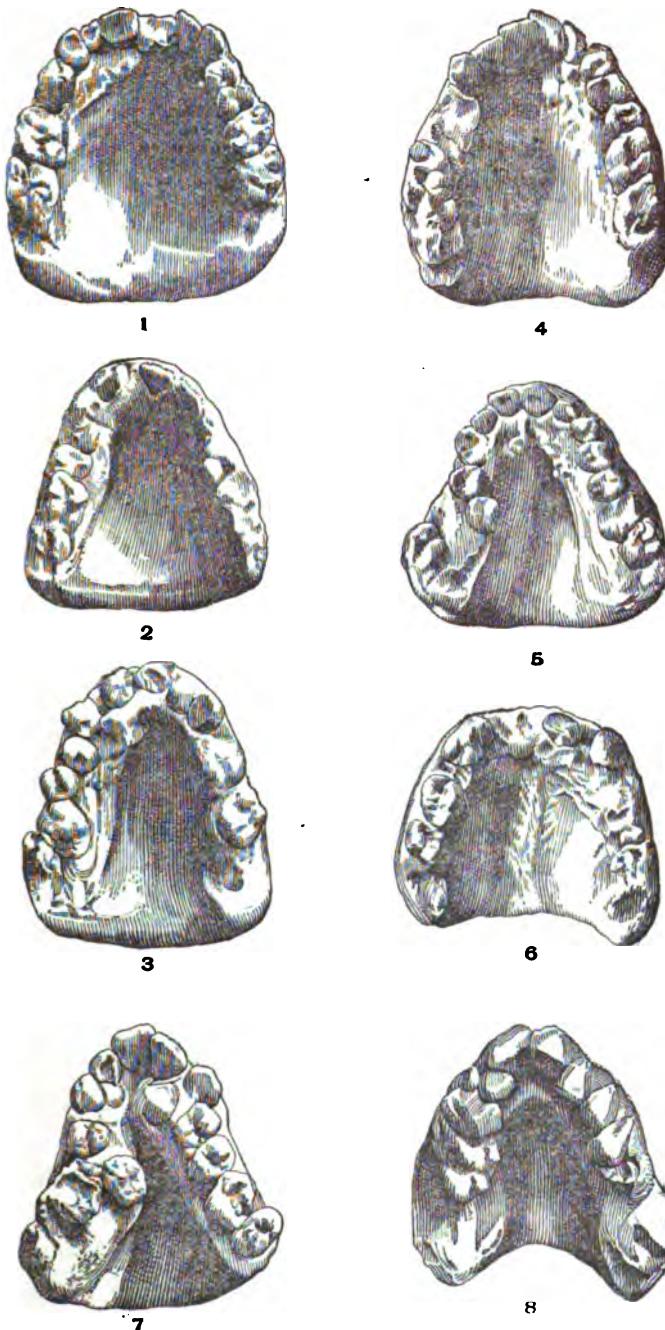
1. Formative and embryonic stage: Acephaly, harelip, cleft palate, deformed palate, spina bifida, talipes, buphthalmos, fibroma molluscum, malformations of organs, some kinds of genetous idiocy, etc.
2. Period of most rapid brain-growth, special-sense education, motor co-ordinations, and speech (from birth up to 7 years): Rickets, pavor nocturnus (night terrors), convulsions of teething, infantile paralysis, epilepsy, stammering, backwardness of speech, hypermetropia, convergent strabismus, lamellar cataract, choroiditis disseminata, strumous ophthalmia, ichthyosis, xeroderma pigmentosum, dermatitis herpetiformis, some varieties of idiocy and imbecility, liability from neurotic causes to sudden rises of temperature, great susceptibility to attacks of all micro-organisms and zymotic poisons, night febrile delirium of children at temperatures from 99° to 101° F. (37.2° to 38.3° C.), child melancholy and child mania (very rare), tubercular meningitis, Friedreich's disease, hydrocephalus, deaf-dumbness, etc.
3. Period of co-ordination of motion and emotion (from 7 to

13 years): Chorea, epilepsy, asthma, somnambulism, megrim, myopia, convergent strabismus, etc.

4. Puberty and adolescence (from 13 to 25 years): Epilepsy, asthma, chlorosis, menstrual defects, hysteria, Friedreich's disease, interstitial keratitis, megrim, adolescent insanity, adolescent stupidity, impulsiveness, dipsomania and perversion of the moral sense and volition, incompatibility of temper, frothy religionism, perverted sexual instincts, unfounded aversion to relatives, arrested body growth (dwarfishness), adolescent ugliness, some kinds of joint diseases, ingrowing nail, acne, valgus douloureux, subungual exostosis of great toe, naso-pharyngeal polypi, beardlessness, barrenness, phthisis, acute rheumatism, etc.

The functions of the nervous system vary in the period of their development, so that we may see in the early functions perfect development, while later functions are absent. These variations are demonstrated in cases of idiocy and imbecility. With a bad neurotic heredity morphological defects are very common, and physical ugliness is a characteristic trait of the majority of idiots, insane, epileptics, criminals, and the "submerged tenth." One of the striking defects is an alteration in the shape of the hard palate, the percentage of the typical palates in the degenerates being only one-half that of the general population. Clouston has investigated the condition of the palate in many individuals, and divides them into three groups. The first is the typical or normal palate; the second, the neurotic, with a more gothic arch; and the third class he calls the deformed palate. (See figures on pages 39, 40, and 41.) The following table will show the frequency of the occurrence of the three types of palates in the various classes of persons examined:—

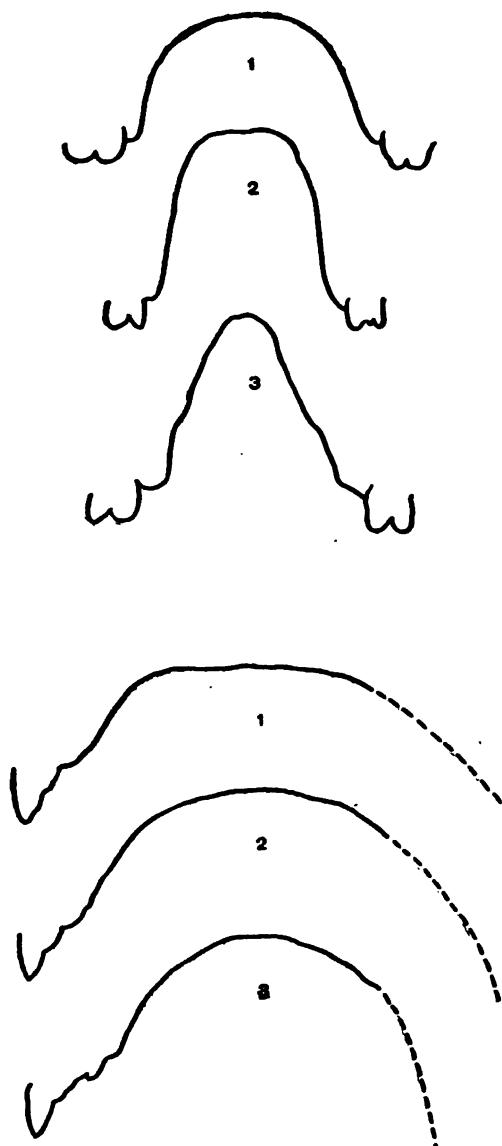
THE DIFFERENT CLASSES OF PERSONS.	No. 1. "Typical" Palate.	No. 2. "Neurotic" Palate.	No. 3. "Deformed" Palate.	Number of Persons Examined.
	Per Cent.	Per Cent.	Per Cent.	
The general population . . .	40.5	40.5	19	604
Criminals (the degenerate) . .	22	43	35	286
The insane (acquired insanity) .	28	44	38	761
Epileptics	20	48	37	44
Adolescent insanity	12	38	55	171
Idiots and imbeciles (congen- ital insanity)	11	28	61	169



STANDARD TYPES OF PALATES.

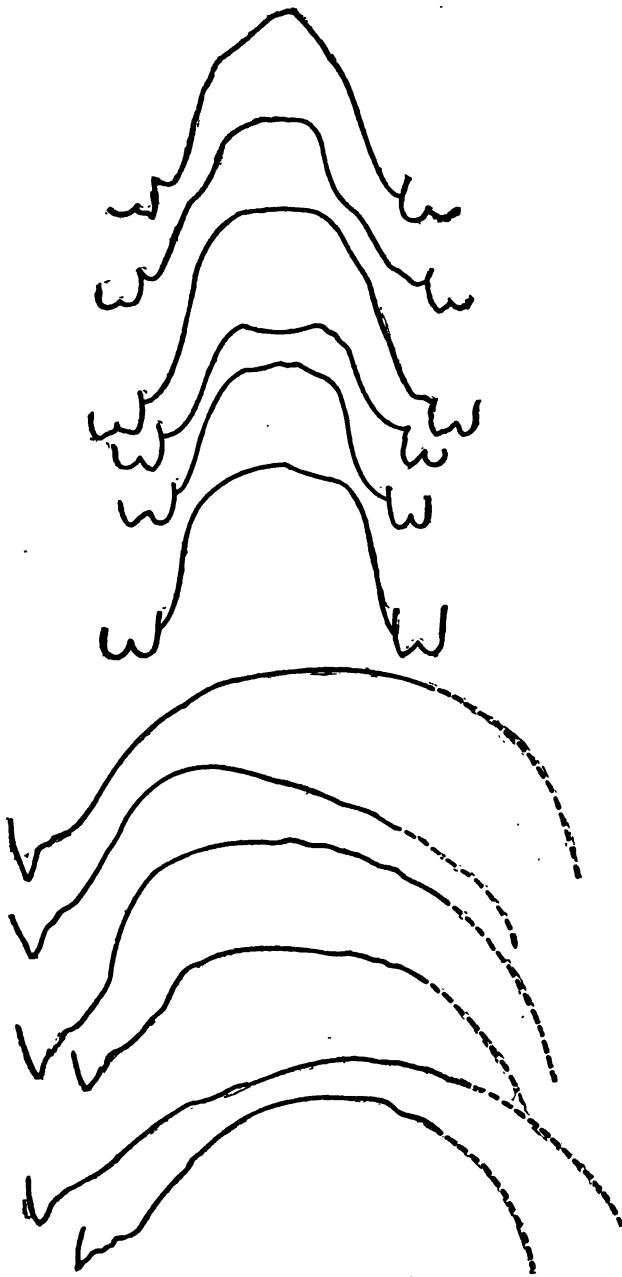
1, typical; 2, neurotic; 3, deformed. Adolescent insanity: 4, neurotic; 5, deformed; 6, deformed, with central ridge. Extremely deformed palates: 7, 8.
(*Edinburgh Medical Journal.*)

Clouston finds that the hard palate has a close connection with the base of the skull. In man the anterior portion of the brain is over the centre of the hard palate, whereas in the monkey the anterior portion of the brain is just even with the posterior edge of the hard palate (see page 42); therefore, in man the hard palate has a distinct relation to the brain-base, and the brain-growth will secondarily determine the shape of the palate; the brain deriving its shape, size, and quality from ancestry, and, a bad heredity determining a bad brain, we see how this will also determine an abnormal palate. A high palate is not, however, to be considered a reversion to a lower type, and the shape of the palate is not dependent upon the nasal cavity. Deformed palates are not due to thumb-sucking in infancy. Although prognathous jaws seem to be a reversion to a lower type, they do not necessarily imply a high palate, which must be referred to a bad initial neurotic heredity. The various developmental diseases, such as infantile paralysis, Friedreich's ataxia, rickets, chorea, hysteria, adolescent insanity, epilepsy, etc., are regarded as being due to a



SECTIONS OF STANDARD PALATES.

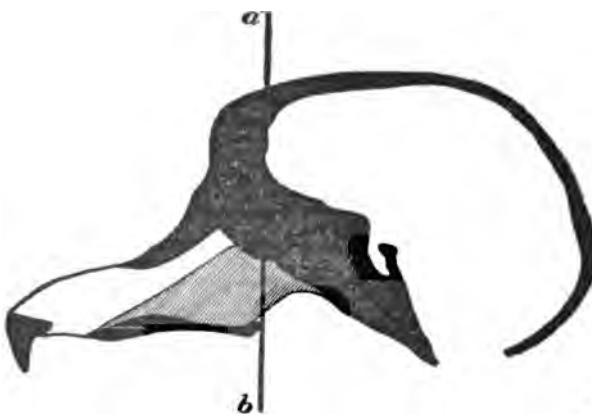
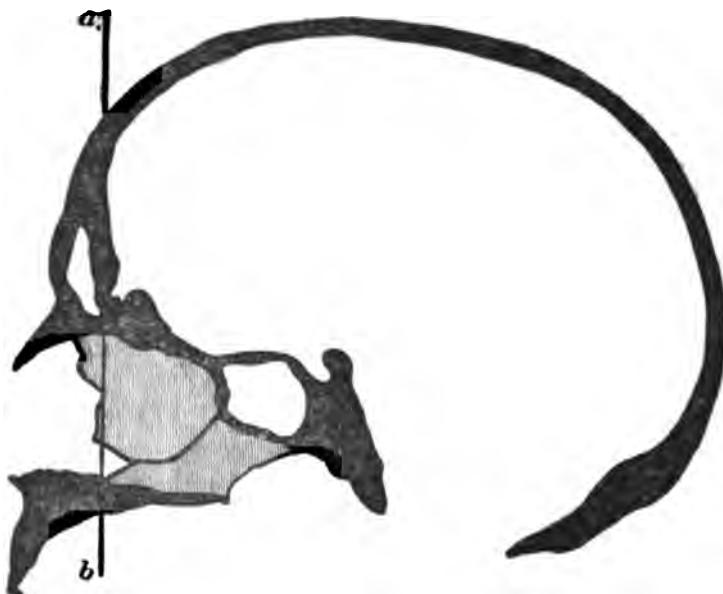
Transverse: 1, typical; 2, neurotic; 3, deformed. Longitudinal: the soft palate represented by a dotted line, figures as above.
(*Edinburgh Medical Journal.*)



SECTIONS OF PALATES IN ADOLESCENT INSANITY.
(*Edinburgh Medical Journal.*)

bad heredity, and are somewhat related to one another. The neuroses are more or less interchangeable in heredity, and the

same condition tends to return. There are two tendencies: one to revert to the normal, healthy type; the other to become accentuated, leading to extinction. The possible factors in the heredity



VERTICAL MESIAL SECTION OF HUMAN AND MONKEY'S SKULLS, TO SHOW
RELATION BETWEEN HARD PALATE AND BRAIN.
(*Edinburgh Medical Journal.*)

of neuroses are so complex and multiform that it must be one of the last branches of medicine to be elucidated. Heredity is regarded as the predisposing cause of all these neuroses and the sole

cause of many ; but Clouston uses the term "neuroses" in a very vague manner, and speaks of distinct gross lesions of the nervous system as neuroses, and symptoms due to location of these lesions as other neuroses which attend them. Although heredity is doubtless the predisposing cause of all, in each case it is a question of degree and intensity, and it fortunately needs, in many cases, a striking cause for the development of the neurosis. In opening up the large field of preventive measures against adolescent neuroses, there are one or two general principles which we are safe in following : Build up the bone and fat and muscle, especially the fat, by any means known to us, during the periods of growth and development. Make fresh air the breath of life to the young. Develop the lower senses rather than the higher ones when there is bad heredity. Do not give too much flesh and nitrogenous food during growth and adolescence, as being special stimulants to the higher cortex and to the early development and dominance of the reproductive functions and the sexual nisus. Avoid alcohol and nerve stimulants absolutely if possible. Do not cultivate, rather restrain, the imaginative and artistic faculties and sensitiveness and idealism generally, in cases where such tend to appear too early and too keenly ; they will be rooted upon a better brain and body basis if they come later. Cultivate and insist upon orderliness and method in all things,—the weakly neurotics are always disorderly, unbusiness-like, and unsystematic. Fatness, self-control, and orderliness are the three most important qualities for them to aim at.

Rosse²⁴² speaks of some of the racial characteristics of nervous affections. He cites various facts showing that in the climate of the West Indies, for instance, the effect of the humidity and extreme heat renders not only men but all animals lazy, inert, and phlegmatic ; even the mosquitoes become lazy and the fish are not game. He finds tabes equally in Hayti and in New York ; and he has seen the neurosis of dirt-eating not only among the Southern negroes and the inhabitants of the West Indies, but among the yellow races of Java, China, and Siberia, and some of the poorer classes of whites in Spain and the Southern States ; and he has noted a habit of swallowing stones among the fur-seals. All over the world the Jews preserve a uniform calm, sober, and sedentary manner, while strange nervous manifestations of an

hysterical stamp are found among the Sioux Indians as well as the Anglo-Saxons. In the black races he finds a lesser intensity of reflex action, a lessened sensibility to alcohol, and a smaller intensity of nerve action. The primitive African seldom sneezes or yawns, nor does he exhibit disgust. The black does not show that fear of death that characterizes whites.

Rosse noted similar characteristics among the Esquimaux and Northern Siberians; but many nervous derangements were noted among the northern tribes who practice Shamanism, such as insomnia, epilepsy, chorea, paraplegia, hemiplegia, and suicidal mania. He speaks of a curious nervous affection, similar to that known in the State of Maine, to which he gives the name Emeryaki, which is seen specially in the neighborhood of Yakutsk, and is due possibly to a combination of influences—extreme cold, the lonely life, and the excessive vodka- and tea- drinking. These people were put in a most profoundly nervous state by simply touching the body, a loud, sharp cry, or pointing of the finger. Tattooing is not only a very wide-spread practice, but the similarity of the tattoo-marks is noted in the most remote parts of the world. Many of the neuroses, of course, are favored by the influences of town life. Rosse notes the frequency of cerebro-spinal affections among several of the yellow races—progressive muscular atrophy among the Polynesians, insanity in China, tabes among the Malays. He has noted tabes, moreover, not infrequently among negroes.

Haig⁴⁷ dwells upon the importance of the retention of uric acid in the system in the causation of nervous affections. He endorses Murchison's list of the disorders of the nervous system associated with lithæmia. In his opinion, excessive uric acid in the system accounts for headaches, vertigo, convulsions, depression, irritability, sleeplessness, pains and neuralgia of varying sorts, migraine, paralysis, and even aphasia. He considers that the majority of people have a tendency to store up uric acid in the system, especially if they indulge freely in meat and wine. In these conditions, therefore, the uric acid must be removed by salicylates and acids, and the formation of more uric acid prevented by an appropriate diet. He regards the various functional disorders as a result of the vascular conditions produced by uric acid, the exact nature of the disorder being determined partly by the

intensity of the lithæmia, and partly by the anatomical and physiological relation of the vessels and nerve-structures concerned: these latter, being inherited, determine in several successive generations the nature of the disturbances which uric acid will produce.

Leubuscher,²² has studied the excretion of acid in nervous and mental diseases by testing the acidity of the stomach in such cases. In half the cases of melancholia and of mania the acid was increased; in general paralysis there was usually a diminution of acid; in chronic alcoholism the proportion was normal; in chronic morphinism it was diminished. King¹¹² regards the nervous system as the governing factor in the human organism, the body being composed of a multitude of individuals, each working out its own destiny; and wherever this constitution of the organism has been gradually acquired and inherited, the presiding government,—the nervous system,—besides ruling the processes of health, regulates also the phenomenon of disease. Massalongo⁵⁸⁰ believes that nervous affections, without known lesions, may yet be localized in many cases in the same manner as the more distinctly organic diseases; thus, the cases of muscular atrophy in hysterical paralysis point to a functional localization in the cells of the anterior horns. Certain other hysterical conditions closely resemble in their symptoms those of organic disease, and may fairly be attributed to functional changes in those regions. He regards heredity as the greatest cause of the neuroses, and second to that comes alcohol.

Reflex Neuroses.—Becker¹¹⁵ thinks that reflexes follow the path of least resistance, both in health and disease. Where there is a tendency toward certain neuroses there is generally needed a peripheral irritation, which can find in these excited nervous cells a path of least resistance, in order to precipitate the trouble. It is highly improbable that in any given neurosis we can say that a certain irritation is the sole cause, and, therefore, Becker is distinctly skeptical as to the various methods of treatment of reflex neuroses which have been advanced.

The Tongue in Nervous Semeiology.—Du Pasquier and Marie⁷⁸ discuss the symptoms presented by the tongue in cases of nervous disease. Exaggeration of the sense of taste is rare, and is seen chiefly in hysterical conditions. Perversions of the sense of taste are not infrequently due to digestive disturbances, but they are also common in hysteria, epilepsy, and various forms of insanity.

The tongue is also the most highly developed organ of muscular sense, upon which probably depends much of our ability to speak, and some of the forms of speech disturbance are undoubtedly due to a loss of muscular sense in the tongue. Complete paralysis of the tongue is rare, but a partial paralysis is frequently associated with other troubles of motility in the tongue. Paralyses are due either to a lesion in the tongue itself or in the bulbar nuclei, or to a paralysis of the facial nerve. In general paralysis, in hysteria, and occasionally in epilepsy, there is a partial paralysis of the tongue, which leads to obscurity in speech, stammering, hesitancy, etc. Tremor of the tongue seems to be in part of a spasmotic and in part of a paralytic nature, and is an extremely common affection, being most marked in general paralysis. Tonic spasm of the tongue is seen in hemiplegia with contracture. Clonic spasm of the tongue is seen in various spasmotic affections, such as hysteria, epilepsy, and chorea. Trophic troubles are not uncommon. A dry tongue is seen in certain functional affections. Atrophy usually points to the existence of bulbar disease. Hemiatrophy is frequent in tabes. Hypertrophy may affect either one or both sides of the tongue, but a complete hypertrophy is often associated with a feeble intellect.

Respiratory Neuroses.—Bremer²⁸ reports a case of deep, slow, and laborious respirations, in a girl of 13 coming of neurotic stock, associated with epigastric pain. Any slight physical exertion greatly increased the trouble. The respiratory centre was apparently too inactive to supply oxygen to the organism. Bremer seemed to think that the trouble was localized in the region supplied by the vagus nerve, and it was possibly due to temporary spasm of the vessel supplying the centre. A second case, that of a man of 36, of a distinctly nervous predisposition, presented somewhat similar symptoms. For years he had had pain in the epigastrium, which was attended with more or less difficulty in breathing. While sitting still he had no trouble, and he could walk fairly well; but talking proved especially distressing and increased the difficulty. In both cases there seemed to be a distinct mental condition akin to hysteria. Sir Andrew Clark⁶ reports certain cases of paroxysmal barking cough, coming on about the age of puberty, usually in patients with a distinctly nervous taint. In some cases the attacks are extremely violent, spasmotic, and

severe enough to produce squinting and temporary unconsciousness. They are to be regarded as largely of a hysterical character. In all cases which he has seen, the patients were overfed and alcohol had been freely given. The treatment is difficult, and he doubts if he has succeeded in shortening, to any great extent, the duration of the disorder; but, by appropriate diet and regimen, abstinence from alcohol, cold or tepid sponging, active exercise and general discipline, sedative applications to the throat, and administration of tonics, he thinks that the patient's general condition may be benefited, and, in that way, that the cough will subside.

NEURASTHENIA.

Among the more elaborate contributions on this subject during the past year may be mentioned Cowles's Shattuck Lecture for 1891. ⁹⁹ July 16 to Aug. 27 The lecturer regards neurasthenia as one of the most frequent and important of nervous diseases, its mental symptoms affording significant indications for diagnosis, prophylaxis, and treatment. The history of the patient shows the early recognition of depression of feeling and weakened mental control, along with irritability, as signs of the characteristic weakness. Insanity, in its functional and curable forms, is always weakness; and its study is useful in relation to neurasthenia, because they have a common etiology. The animal organism is biologically a mechanism made up of minor parts or mechanisms. Physiological activity always tends to fatigue, which may be local or general. The study of neurasthenia, or pathological fatigue, presents two essential conditions: 1. In normal fatigue, with the discharge of energy, the toxic products of exercise are always formed in nerve- and muscle-tissues. From this and other sources, toxic elements may accumulate in the blood and tissues; in pathological fatigue, these contribute to a local or general inanition and auto-intoxication. Visible changes in nerve-cells, attending normal fatigue, go to support the inference of a molecular and chemical variation in pathological fatigue, manifested as a condition of exhausted or changed nutritional power. These changes bear a direct relation to the etiology and pathology of neurasthenia; and habit, diathesis, and idiosyncrasy have an important influence in causing "dispositions to repeat organic processes," both normal and abnormal. Physiological chemistry gives us some knowledge of the nature of auto-

genous toxic substance. 2. The study of the mental elements in normal and pathological fatigue shows that the mental symptoms furnish a ready index of the "fatigue,"—(1) the emotional tone is either one of well-being or ill-being, and the latter, with mental depression, indicates changes in the "sense of body" or common sensations, due to deficient energy, inanition, and auto-intoxication; (2) special disorders of intellect and will are shown by a neurasthenic weakening of voluntary attention, or the mental power of inhibitory control, and of memory, etc.

The analysis of normal and pathological fatigue shows that the mental symptoms of the latter may be readily recognized, that they correspond with the physical events in neurasthenia, and that all these phenomena, as far as they go, are in unity with the like conditions of melancholia. The symptoms are objective and subjective,—mainly the latter, which include the mental symptoms. These fall by analysis into four distinct groups, relating to (1) mental depression and a sense of ill-being; (2) diminished power of voluntary attention and mental control; (3) introspection and worry, with attention acting in its attracted form; and (4) changes in the "sense of body,"—irritability and hyperæsthesia, languor and anæsthesia. Two consequent conditions become prominent, and are of the highest clinical importance,—morning tire and anæsthesia of the sense of fatigue. The summary of symptoms leads to a definition, including both the physical and mental elements, as expressions of the inanition and auto-intoxication of pathological fatigue, viz.: neurasthenia is a morbid condition of the nervous system, and its underlying characteristics are excessive weakness and irritability or languor, with mental depression and weakened attention. The diagnosis is made clearer by an analysis of the mental symptoms, which are true and sensitive indices of the lower physical changes. This aids in prophylaxis. Neurasthenia may be regarded as the initial term of many nervous disorders having a varied etiology. The treatment, with special reference to the objective symptoms, logically includes elimination, nutrition, rest, exercise, massage, and promotion of sleep. The subjective, and especially the mental, indications, being the earliest and most significant from first to last, are the best guide to treatment; this must be suited to the two different stages of neurasthenia,—to the condition of its first-effects and its after-effects, and

to different types of patients. The plain philosophy of treatment is to recognize the mental symptoms at first showing the need of it, and to address it to the restoration of a healthy emotional tone as the central motive element; the lowering of this and the weakening of attention and inhibitory control are always the earliest signs of neurasthenia. The maintenance of a normal sense of well-being is the sign of bodily health. Normal fatigue is simply wholesome tire; exercise should always be kept within the limits of pathological fatigue, in which the sensory overtire, as fatigue anaesthesia, marks the subtle beginning of danger. The natural safeguard is in the early recognition of the other mental effects of "fatigue." These considerations go to prove the prime significance of the mental symptoms as a guide to the prophylaxis and treatment of neurasthenia.

Bouveret²¹² believes that neurasthenia should be attributed to a disturbance of the nutrition of the nervous elements, to an impoverishment of the nervous force, and especially to a chronic enfeeblement of the superior nervous centres which regulate the activity of the inferior centres. The hereditary cases generally occur between the ages of 15 and 20, while the acquired form is observed at a later period,—from 30 to 40 years. The Slav and Jewish races are especially predisposed to the trouble. The exaggerated action of the brain in the sphere of the intellectual faculties is the most common and best-established cause of nervous prostration. It is common also from the abuse of stimulants, from excessive muscular exercise, and sexual excess. Uterine affections are unimportant in the causation of the disease, and the local symptoms are more apt to be due to neurasthenia than to be a cause of it. Nervous dyspepsia is a common accompaniment. The principal clinical forms are: (1) neurasthenia in women; (2) traumatic neurasthenia, which is quite common, being frequently associated with hysterical symptoms, and is one of the most obstinate and intractable forms; (3) neurasthenia of a common type. The principal symptoms are headache, insomnia, cerebral depression, and muscular weakness. Morbid fears are also not infrequent symptoms. Digestive disturbances are especially common. He considers that the cerebral and spinal type should be distinguished. In the former, headache, a feeling of constriction about the head, pains at the back of the neck, mental depression, excitation of the

senses, aggravation of all the symptoms under the influence of intellectual effort, morbid fears and enfeeblement of the memory and will, gastro-intestinal atony, and disturbances of the general sensibility are the common symptoms. In the spinal form the principal symptoms are: pain and tenderness of the spine, neuralgic pains in the chest and limbs, formication and cramps in the arms and legs, muscular weakness, coldness of the hands and feet, vaso-motor disturbances, gastro-intestinal atony, and genital disturbances. In neurasthenia reflex action is generally increased, while in most organic affections of the nervous system it is diminished. It is very easy to confound hysteria with neurasthenia, since there are cases which are actually between the two, and still other cases in which the two diseases combine. There is a large class, who are often termed "rheumatics," who suffer from flying pains in the limbs, trunk, and head, apt to be worse in bad weather. The moral influence of the physician plays a most important part in the treatment of neurasthenia. In regard to treatment, the writer indorses fully the so-called Weir Mitchell method.

Strum¹⁵⁶, thinks that irritation of the eye, either by too vague or glaring contrasts of color, may have an influence on the mental state. He thinks that defective light may be irritating to the nervous system, and thereby lead to nervous weakness.

Champagnac⁵⁰⁵ has made a careful study of the relations of neurasthenia to the alterations in the digestive tract, and concludes as follows: (1) the conjunction of gastrectasia, of prolapse of the right kidney, and of neurasthenic symptoms is absolutely incontestable; (2) it is possible, by judicious treatment of the dilatation of the stomach, to cure the nervous symptoms which accompany and follow it; (3) this treatment does not cause the dilatation to disappear, but arrests the phenomena of auto-intoxication, the point of departure of the neurasthenic disturbances; (4) although the gastrectasia does not disappear, the patient ceases to be a nervous invalid; (5) in the pathogenesis of the neurasthenic symptoms, the author does not accept the theory of Glenard (enteroptosis), preferring rather that of Bouchard (the pathogenetic importance of the gastric dilatation); (6) he finds the nervous theory (Beard) insufficient, and incapable of explaining the neurasthenic phenomena when these have been preceded by the dyspeptic symptoms.

Pelizaeus⁶⁹ describes what he terms artificial neurasthenia,

coming on in patients who indulge indiscriminately in baths and mineral waters. When the reaction from a cold bath is followed by loss of control of the will, shrinking, depression and weakness, if the baths be persisted in, the process will undoubtedly cause a lessening of the resisting powers of the nervous system; but many patients go to the baths and take a regular course of treatment, in spite of the discomfort it may cause, and this leads to neurasthenic conditions. The writer urges a greater amount of care in cases which are sent to these resorts. Blocq ³⁶³ _{nos. 22, 23} calls attention to a peculiar set of symptoms, dependent ordinarily upon neurasthenia. The patients suffer from localized pain, which is not confined to any physiological or anatomical area. The painful spot may exist alone or it may exist in conjunction with other phenomena. The progress of the disease is extremely slow, often lasting for years, but the trouble ends in complete recovery. He considers it a clinical manifestation of a fixed delusion of sensation, but its mechanism differs from all auto-suggestions of pain in hysteria and the emotional obsessions of hypochondria. Treatment should be to re-establish the nervous equilibrium and the physical strength and to divert the fixed delusion of sensation. Blocq ⁴⁶ _{det. 15} claims that there is not a condition of nervous weakness in what is termed neurasthenia, and protests against the employment of the term. He prefers to use the expressions "nervous state" or "neurosis," which imply no theory. Joseph ¹⁰⁷ _{Aug. 18} protests against Arndt's view that neurasthenia has been known for thousands of years. He considers Beard as entitled to the credit of having given the affection a definite position in medicine. He describes various cases, probably of tabes, which he considers possibly neurasthenic, and to which he gives the name of pseudo-tabes. Benedikt ⁸⁴ _{Feb. 20} defines neurasthenia as sensitiveness to fatigue, which may be the result of exhaustion, but is not synonymous with it. Although termed neurasthenia, it is not a weakness, but a morbid increase of the feeling of fatigue. It may affect the psychical working of the intellect, the sensibility, and the will. It is either congenital or acquired. It is therefore a definite symptom, which may appear in a condition of general nervousness, and may bring on such a condition. It is seen almost exclusively in brain-workers. In regard to treatment he points out that cocaine will bring about a transitory improvement in neurasthenic conditions, but he warns the physician most strongly to

beware of its use in any such conditions, since it leads to the cocaine habit and to a very marked increase of the trouble.

Pfannenstiel,⁹⁹ studying various cases of neurasthenia and nervous dyspepsia, points out that nervous dyspepsia may be primary and accompanied by general nervous symptoms, or secondary; the latter is much more frequent, and is due to a neurosis. In these conditions we find trouble with the nerves of secretion, especially those which regulate the secretion of the gastric juice. These troubles are manifested under the form of hyperacidity and hypersecretion, or subacidity, or, finally, an absence of acid. The hyperacidity is always due to the increase of hydrochloric acid.

Blocq¹⁰⁰ gives a general description of the affection, which he classifies in this form: Neurasthenia, without any excessive predominance of any syndrome (general neurasthenia); with predominance of a syndrome, affecting more particularly the central nervous apparatus (cerebral, spinal, or sympathetic neurasthenia); or, affecting more particularly the peripheral nervous apparatus (local neurasthenia). He considers neurasthenia as a neurosis which, in every case, has its seat in the brain. It differs from hysteria in that the hysterical are extremely suggestible, while the neurasthenic are very slightly so. In hysteria there is a perversion, in neurasthenia a catalepsy, of the will. In hysteria there is a sort of contraction of the power of consciousness, and an idea acquires an intensity which renders it dominant. Other portions of the brain seem depressed or inactive. The neurasthenic, on the contrary, is not capable of realizing an idea, by reason of the real depression of all parts of his intellect. If exercised in the intellectual domain, this weakness determines the cerebral form. The diminution of regulatory power, exercised normally by the brain upon other parts of the nervous system, explains the spinal and sympathetic forms. The visceral functions become conscious, and thus provoke a series of abnormal sensations. The local forms are produced by a similar mechanism. He opposes the theory that neurasthenia depends largely upon intestinal disturbances. In many cases it may develop more or less rapidly as a result of over-work, emotions, and injury. It may be the first link in the neuropathic chain as an eminently favorable field, upon which, in following generations, the gravest nervous affections may de-

velop. Levillain²⁰⁸³ describes the affection and dwells especially upon the efficacy of static electricity, as applied by Vigouroux.

Lockwood^{1,2,3} dwells upon the importance of overwork in schools, of undue emotion, of too much leisure with lack of profound convictions, and of suboxidation with lithæmia, in the causation of the disease. Giuffre⁷⁷² _{Dec. '90} mentions the fear of a height, which is accompanied by distress, thoracic oppression, palpitation, chilliness, weakness of the knees, and a profound desire to get away from the place, which he regards as a special form of the dread of space, and as characteristic of neurasthenic conditions. Régis¹⁸⁸ _{Apr. 5} speaks of the different forms of obsessions, which he regards as symptomatic of neurasthenia. He includes in them not only the ordinary forms of the insanity of doubt, but also convulsive tic, coprolalia, kleptomania, pyromania, dipsomania, and the morbid impulses to suicide and homicide. Plicque¹⁰⁰ _{Sept. 16} dwells upon the efficacy of static electricity and of general faradization in the treatment of neurasthenic affections. The static-electric treatment should begin by electric baths, followed by the electric breeze, sparks, and electric friction.

Benedikt⁵⁷ _{Apr. 1} considers neurasthenia as a psychical condition excited by psychical emotion and intellectual overwork, claims that psychical treatment is equally important, and that the moral cure has been of late neglected, although he is distinctly skeptical as to the cure of all ills by suggestive treatment. The important question is whether to permit the neurasthenic to work or to demand absolute rest. Strictly absolute rest, however, increases the affection, and the patient should always be led to occupy himself in a suitable manner, but the occupation should often be light and partake of the character of an amusement. He thinks isolation or removal from one's family or surroundings is often essential. He claims that if the Americans would learn from the Germans how to amuse themselves instead of yawning on holidays, the danger of neurasthenia would be diminished. Whoever has not learned how to play and jest easily succumbs to mental work. He lays a special stress upon electricity, and, for drugs, upon iron and arsenic. Du Rocher²⁴ _{Feb. 8} commends the use of static electricity by means of an electrode passed into the stomach. Perdigó⁴⁹⁴ _{Sept. 15, Oct. 11} also writes on the treatment of neurasthenia, but adds little that is new.

HYSTERIA.

Prince²⁶² considers various symptoms which are usually regarded as hysterical, notably the so-called hysterical joints. He considers "hysterical" a word which explains very little, and thinks it important that the differences in the various processes regarded as hysterical should be recognized and the different types classified according to their pathology. He calls attention to the law of association of mental processes, which is that ideas, sensations, emotions, and volition, occurring together, tend by constant repetition to become so strongly associated that the presence of one of them reproduces the other. He therefore terms these conditions associated neuroses and psychoses. He points out the association of mental states with normal and pathological and physiological processes. Thus, merely looking at the sea may produce the symptom of seasickness; and, in general, a pathological process in the nervous system, once engendered by an external agency, may afterward be awakened, on the cessation of that agency, by means merely of the physiological action or psychological state previously associated with it. In the so-called hysterical joints, he believes that there is, in the first place, some injury to the joint. Every attempt to use the joint at first causes pain, and finally the sensation of movement in the joint becomes so closely associated with the sensation of pain that, after all disease of the joint has disappeared, the sensation of movement may still excite the sensation of pain. The practical application of this theory is that in such instances we should break up the morbid process of association. Thus, in a case of contracted hysterical joint, he directed the patient's attention to moving the patella instead of moving the joint, and finally obtained a complete straightening of the limb. He thinks that in a large class of neurasthenics we are to look for the causes not in diseases of the nerves and nerve-centres, but rather in a pathological association of normal and anatomical elements, and that treatment is to be directed to the breaking-up of this association and the re-grouping of the nervous centres.

Bastian⁶ also objects to the term "hysterical paralysis." The cause of the failure of functional activity may be ascribed to imperfect blood-supply or to some primary failure of nutritive activity on the part of the nerve-elements. The first theory has

little support in facts, for the existence of vasomotor nerves in the brain and cord is still in question, but a local failure of nutrition is also difficult to understand. He classifies the cases of functional paralysis into those of cervical and those of spinal origin, the former including many cases ordinarily spoken of as hysterical paralysis. The distinction of functional spinal from functional cerebral he regards as still obscure. There may be two forms of spinal cases: the spastic and those of a flaccid type. These two forms correspond to a perverted or depressed activity in one or the other of the two definite regions of the cord which have to do with the manifestation of voluntary movement; the spastic type, for instance, corresponds to a diminished or perverted activity in some part of the course of the pyramidal system of fibres, while the flaccid type corresponds to a diminished activity in the groups of great ganglion-cells in the anterior horns. He enumerates the varieties of functional disturbance, and gives a synopsis of their principal clinical characteristics in the following table:—

Cases of Functional Paralysis of Cerebral Origin.

VARIETIES.

1. Affection of kinæsthetic centres of Rolandic area alone.
2. Ditto, plus an affection of sensory region of internal capsule.
3. Affection of sensory region of internal capsule alone.
4. Affection of efferent fibres from kinæsthetic centres in Rolandic area.

CHARACTERISTICS.

<ol style="list-style-type: none"> 1. Loss of muscular sense with motor paralysis. Also slight loss of tactile sense with defective power of localizing. 2. Ditto, plus more or less complete hemianæsthesia. (The paralysis flaccid or spastic.) 3. No motor paralysis. More or less complete hemianæsthesia (superficial and deep, the latter including loss of muscular sense). 4. Aphemia or "hysterical mutism." If purely motor paralysis of limbs, then no loss of muscular sense.

Cases of Functional Paralysis of Spinal Origin.

5. Affection of pyramidal system of fibres in spinal cord.
6. Affection of anterior cornua in certain segments of spinal cord.

<ol style="list-style-type: none"> 5. Spastic paralysis with no distinct loss of muscular sense. Also no hemianæsthesia or other cerebral symptoms. 6. Flaccid motor paralysis with or without some loss of sensation. No distinct hemianæsthesia and no marked loss of muscular sense.

The prognosis is reasonably good. In the majority of cases a cure is finally obtained, but the illness may often be protracted over a period of years, and in some cases probably a distinct organic

affection of the nervous system develops. In the treatment Bastian praises faradism and the use of the wire brush. He indorses the Weir Mitchell treatment to a degree, but has little to say in favor of hypnotism. Pitrès,⁷³ in discussing traumatic neurasthenia and hystero-neurasthenia, divides neurasthenia into various forms: the cerebral form, where headache is the constant symptom; the spinal form, where spinal pain predominates; the neuralgic form; the cardiac form; the gastro-intestinal form, associated with capricious appetite and indigestion; and the genital form. These divisions, however, are merely schematic, for the patient often presents a variety of symptoms. He points out that neurasthenia may not infrequently follow severe accidents, and the symptoms then take the form of disturbed intelligence, disturbed sensation, and disturbed motility. In some of these cases there may also be hemianesthesia, contracture, abolition of the pharyngeal reflexes, and contraction of the field of vision, which are to be regarded as hysterical symptoms. This association he regards as very common, and in some cases (as in one which he reports) the other severe neuroses may also develop, as, for instance, exophthalmic goitre.

Hysterical Tremor.—Dutil⁴⁵² has continued the study of hysterical tremor, referred to in last year's ANNUAL (vol. ii, C-69). The commonest form of tremor in hysteria seems to be that of moderate frequency, from five and one-half to seven and one-half oscillations a second. There is a remittent intention tremor which closely resembles the tremor of mercurial poisoning. It is, like all hysterical tremors, most marked upon one side. It resembles somewhat imperfectly the tremor of multiple sclerosis. Another form assumes a paraplegic type and simulates the tremor of spastic paraplegia, but the knee-jerks are not exaggerated. There is rarely a pure intention tremor closely resembling that of multiple sclerosis, and the cases of pseudo-sclerosis of Westphal are regarded by Dutil as due to this form of hysterical tremor. The slow tremors, from four and one-half to five oscillations a second, may closely resemble those of paralysis agitans. In other cases there are mixed forms of tremor which cannot be classed with these varieties. Treatment is often ineffective. Suggestion, the magnet, and electricity have, in his cases, produced no effect. Oddo⁴⁶ states that hysterical tremors may be detected by certain common traits. These

are of three types: the hystero-emotional tremors, arising from fright, emotion, etc.; the hystero-toxic tremors; and a purely hysterical tremor, consecutive to hysterical attacks. Their evolution is often characteristic, coming on after a shock and attended with headache and intellectual troubles. The tremors may vary in character, and are not infrequently of an anomalous type. Boinet ^{July 11, 1886} reports a case of hysteria produced by fright, in a man, where the hysterical attacks were followed by a series of motor troubles, consisting of trembling, with tremor of slow oscillations, rhythmical chorea, convulsive tic, and symptoms of *paralysis agitans*. In connection with this, he notes the cases of pseudo-sclerosis of Westphal, and considers that some of them are probably distinct from hysteria. Two cases of hysteria are reported by Rémond. ¹⁰⁰ _{Jan. 8}

Hysterical Facial Paralysis.—Descroizilles ¹⁴ _{Jan. 7} reports a case of hysterical facial paralysis in a girl of 9½ years of age. There was no other paralysis, excepting of the tongue, and no sensory disturbances. Cases are also reported by Ballet ⁸ _{Jan. 14} and Chantemesse. ³ _{Jan. 20}

Convulsions.—Pitrès ¹⁰¹ _{May} urges that, in the treatment of hysterical convulsions, all attendants who are not needed should be banished from the room. The first thing to be done is to put pressure upon any hysterogenic zone. Suggestion may be effective, but it often fails. A constant current, rapidly reversed, is also beneficial. Drugs are sometimes serviceable, but should be used with care. In cases where there are distinct hysterogenic zones, constant pressure upon them by means of a truss sometimes proves serviceable. He finds, moreover, that in some cases the wearing of colored glasses, varying the color with the individual, has a distinct effect.

GERLIER'S DISEASE.

Gerlier ¹⁹⁷ _{April, May} reports 2 cases of this curious affection, described in last year's ANNUAL, which have occurred since 1888. In 1888 and 1889 there were very few cases. In these years the weather was exceptionally cold and damp, and the wind was very bad. In 1890 the weather was good, and the affection returned. In that year he observed personally 10 cases, and believes that they had their origin in the stables. He opposes the views of Ladame, that the affection is distinctly a psychical one, by citing a case which occurred in a cat. The cat had attacks, in which she apparently

did not see and was unable to walk and finally sank down on the floor. She had lived in a stable, and her master was also affected. The muscles of the jaw were implicated, and the cat had much difficulty in eating,—a sort of false trismus. He found three other cats which were affected in the same way. To this Ladame¹⁹⁷ replies that, although not holding unreservedly to the theory of mental contagion, he cannot accept Gerlier's hypothesis that there is a definite microbe existing in the stable, even though cats are affected; for the animals which live in the stable are never affected, and he has seen cats, which presented symptoms similar to those described by Gerlier, that had never been in a stable.

CHOREA.

Pathology.—Jakowenko⁵⁸⁰ has examined the brains of 6 persons who died from chorea, with acute delirium. He found in the lenticular nucleus characteristic corpuscles, usually in the anterior part of the globus pallidus. In only 1 case they were found outside of it. Where there were few corpuscles there were accumulations of pigment and degeneration and varicosity of the nerve-fibres. In the periphery of the globus pallidus these bodies were found in the neighborhood of the vessels or in the walls of the capillaries and in the perivascular lymph-spaces. In 2 other cases, dying of acute delirium without chorea, these corpuscles were not found. They were regarded as having some direct relation to chorea, and were supposed to be a product of hyaline degeneration. Wollenberg³⁶⁸ ² B.B.H. 1; Sep. Sept. 18 has made a careful examination of the brains of 6 persons suffering from chorea, and, in order to control his results, has examined the brains of 46 persons not suffering from chorea. He has arrived at the following conclusions: (1) in some cases of chorea there may be found, in the neighborhood of the lenticular zone, a well-marked zone of numerous small, brightly-refracting bodies, of rounded shape, which lie in the paths of the vessels, and are very resistant to coloring reagents; (2) this appearance is in no way characteristic of chorea, for these bodies may be seen in a similar position in the brains of many persons who have never suffered from chorea; (3) these bodies are probably due to the calcification of an organic substance in the brain, the nature of which is at present unknown. Alcohol, ether, and osmic acid had no effect on these bodies. Acetic acid

gave them a stratified appearance in certain cases. Sulphuric acid first converted them into needles and then dissolved them. Hydrochloric acid sometimes did not affect them; sometimes it dissolved them.

Ruffini¹⁷ found old disease of the spinal cord in a case of chorea of twenty years' standing, without alteration of the peripheral nerves. Berkley⁸⁵⁸ hints at the possibility of an infectious origin for chorea, and reports a case of chorea insaniens in a woman of 27, who had had two attacks of rheumatism, and, with the second, had had delirium and irregular movements of the limbs. She was suddenly attacked four years later by jerking, beginning in the right arm and involving the entire body. The movements became very violent, and, in a short time, maniacal excitement set in, and the patient rapidly succumbed. The autopsy showed an acute endocarditis, abscess of the parotid, and catarrhal pneumonia of both lungs. The changes in the nervous system were extensive. The pia was somewhat infiltrated with round-cells and blood-discs. There were patches of endarteritis. The nerve-cells in the cortex were more granular than usual. The vessels were often filled with accumulations of round-cells, occasionally imbedded in hyaline masses. Proliferation about the vessels was not uncommon. Numerous minute haemorrhages were found in the pons, which gradually disappeared in the medulla. Berkley considers that the focal inflammation between the gyri, at the base and around the pons, and, in less degree, the patches on the cord are significant of an infectious trouble, as are also the infiltration of these same spots with dense deposits of small round-cells around the vessels, a swelling of the meningeal and endothelial nuclei, and the infiltration of the membrane with leucocytes. He believes that the endo-arterial swelling could be produced only by the action of some germ. No special germ, however, could be discovered. A second autopsy, made upon a dog, showed a thickening of the pia, with marked infiltration. He regards chorea as a general systemic affection, acting with greatest intensity upon the vascular system and the lepto-meninges; its cause is to be sought for in a special bacillus. He regards the chorea corpuscles of Flechsig and Wollenberg as by no means peculiar to chorea; they are to be found not only in the globus pallidus, but in other parts of the brain; not only in chorea, but in normal brains, and

are most probably artefacts. Pianese ⁵⁸⁹ obtained, in a fatal case of very severe chorea, a special bacillus in the cervical portion of the cord, which is found on the culture media at a temperature of 20° to 38° C. (68° to 100.4° F.). It develops gas when cultivated in gelatin, has a capsule, and shows slow movements when growing in a hanging-drop. Inoculation of these bacilli in animals gave negative results, except where inoculated under the dura, into the cord, or the sciatic nerve. In such cases the symptoms produced were a tremor, either general or local. The animals became extremely irritable, and cried out when touched along the vertebral column. There next appeared contraction in one or more of the limbs, and the gait became uncertain and difficult. The animals generally died on the fourth day. After death, these bacilli were found only in the nervous system; the ganglion-cells, especially those of the anterior horns, showed changes similar to those described in some cases of chorea. Starck ¹⁵⁸ reports a case of very acute fatal chorea, where there were various emboli in the corpora striatum.

Symptomatology.—Perisson ⁷⁰ has studied the paralyses which sometimes occur in chorea. They begin gradually or suddenly, and disappear gradually. They are accompanied by a diminution or abolition of knee-jerks, and by absence of sensory troubles. Atrophy is not uncommon. The majority of cases recover. Simon ¹⁸⁴ also reports a case of paralysis with chorea.

Chorea and Rheumatism.—Groeddel ⁸⁴ discusses the old question of the relationship between chorea, rheumatism, and heart disease, finding rheumatism in 37 out of 52 cases and heart disease in a great majority. Duckworth ¹⁰¹⁸ maintains that chorea is merely a manifestation of the rheumatic habit, but he discards the embolic theory. In the treatment he commends chloral to control the motor disturbances. He also advises gymnastics and the use of mild, cold baths at home. Comby ⁸ finds rheumatism in a very small proportion of his cases. Koerner ⁶⁹ says that chorea never arises in healthy children from imitation, but that in all cases of so-called epidemics we have to do with an hysterical affection. In weak and poorly-nourished children chorea is often developed in the schools from overwork. Nothnagel ²⁸³ thinks that chorea stands in direct relation to rheumatism, and the most important argument in favor of this theory is, that in some cases

rheumatism ends when chorea begins, and when the chorea disappears comes on again. He discards the embolic theory, but believes that chorea, in some cases, must be attributed to a special action of rheumatic poisoning. Dale, ⁶ in 20 cases, has found only 3 cases of rheumatism and 8 cases of heart disease, but he considers that, while the character and the cause of the heart-murmurs are far from being settled, there is a distinct connection. Simon ¹⁴ _{June 14} maintains that chorea is almost always of a rheumatic nature, and that the cases of nervous origin are, at any rate, rare. Sée ³¹ _{Oct. 15, 22} upholds the rheumatic nature of chorea, finding in 134 out of 196 cases that rheumatism was present, and he maintains that, in the majority of cases, chorea is the result of rheumatic diathesis, although cases occur which must be considered as true neuroses. The rheumatic theory is also supported by Saint Philippe ¹⁸⁸ _{June 22} and Brown, ²⁸² but only on the evidence of single cases.

Lectures on chorea are given by Baumel, ¹⁷ _{July}, Scurr, ³³⁹ _{Sept. 18} Engel, ¹⁷⁶ _{Feb.} and individual cases by Sollier ¹⁵² _{Feb. 6} and Roussel, ⁷⁶⁰ _{Dec. 28, '90} containing nothing new.

Rhythical Chorea.—Seglas ⁸ _{Apr. 15} and Joffroy ⁸ _{Apr. 8} report cases of rhythmical chorea associated with the ordinary type.

Hysterical Chorea.—Cases of hysterical chorea are reported by Laveran, ³ _{Jan. 11}, Hoch, ⁷⁶⁴ _{Apr.} Mathieu, ¹⁰⁰ _{Aug. 15}

Chorea and Lead.—Girat ¹⁷ _{May 7} reports a case of hemichorea following lead poisoning.

Hereditary Chorea.—Sinkler ⁸¹ _{Nov.} has added 3 cases to those he has already collected, which, however, present nothing particularly new. Mirto ⁵⁸⁹ _{Aug. 5} continues his study upon chronic progressive chorea, which he regards as characterized by a slow, chronic, and progressive course, the choreic movements being diminished by voluntary acts, by disturbance of speech and intellect, and by a fatal termination. He reports a new case, in which there was no heredity, and dwells upon the differential diagnosis, which, however, contains nothing particularly new. Other cases of hereditary chorea are reported by Jolly, ⁶⁸ _{June} Osler, ⁷⁶⁴ _{Dec. 20} Biernacki, ⁴ _{June 2, '90}; and cases of chorea in the aged are reported by Fry ²⁴² _{Sept.} and Ferrier. ⁶ _{June 20}

Treatment.—Little that is new has been advanced in regard to the treatment of chorea. Leroux ¹⁴⁸ finds that antipyrin had a beneficial effect in 40 out of 60 cases, but in three-fifths of these cases the affection recurred. Where the drug failed the failure

was due to intolerance or cutaneous eruption, but in a few cases it seemed to have no effect. It was found necessary to give large doses, and he found that doses from 3 to 6 grammes ($\frac{1}{2}$ to $1\frac{1}{2}$ drachms) were well tolerated for some weeks. Moncorvo⁶⁷ has given exalgin in doses of 20 centigrammes ($3\frac{1}{6}$ grains), which resulted in complete cure at the end of eighteen days.

HEADACHE.

Dercum,¹¹² in a lecture upon headache, gives a very good summing up of our present knowledge. He classifies headaches as follows:—

I. Organic headache.

II. Non-organic or functional headaches: 1. Headache with sympathetic nerve involvement—migraine. 2. Headaches from purely functional disturbances of nutrition: (a) headache from anaemia; (b) headache from hyperaemia. 3. Headaches from disturbances of nutrition from diathetic and toxic causes: (a) diathetic headaches,—lithæmic, rheumatic, diabetic, uræmic; (b) toxic headaches,—malarial, alcoholic, lead, tea, and coffee headaches. 4. Headaches of reflex origin: Eye headaches, nasal headaches, gastric headaches, cardiac and pulmonic headaches, uterine and ovarian headaches, bowel headaches. 5. Hysterical headaches. 6. Neurasthenic headaches. 7. Headaches associated with the various febrile disorders. The points in favor of organic headache are constancy of pain associated with ocular sensory disturbances, and at times localization of pain or tenderness on percussion. Migraine may be differentiated by the one-sided character of the attacks, by the sympathetic nerve disturbances, and by the existence of prodromal symptoms. In the treatment of migraine he commends the giving of digestible food, sufficient exercise, and antipyrin and cannabis Indica. The anaemic patient needs especially iron and nutritious diet. The neurasthenic headache should be treated in the ordinary methods of forced feeding, and especially by rest in bed. Without rest in bed he believes that the headache cannot be cured. The malarial headache requires very large doses of quinine—20 to 30 grains (1.30 to 2 grammes). Suckling³² found in 186 cases that the most common varieties of headache were: anaemic headache, 32; syphilitic headache, 18; periodical

and migrainous, 18; mental strain, 12; traumatic, 12; Bright's disease, 10. Simon¹⁰⁰ _{Mar. 20} divides the headaches of childhood into those of growing headaches, from fatigue and mental overstrain, from digestive disorders; from different neuroses, such as over-excitement, hysteria, epilepsy, and chorea; from gouty diathesis, anæmic and toxic causes; from disorders of the naso-pharynx, ear, and eye, and those which precede meningitis. Hamilton²⁰⁹⁴ has published a monograph upon this subject, in which he classes headaches into six groups—congestive, anæmic, organic, toxic, neuralgic, and neurasthenic. Congestive headache he treats by catharsis, bromide, and cocaine; anæmic headache, by cannabis Indica and iron. The commonest toxic headache is lithæmic, which should be treated by restricted diet, salicylic acid, alkalies, or colchicum. Neuralgic headache, affecting the trigeminal distribution, yields quickest to aconitine, pushed until the physiological effect be obtained. Neurasthenic headaches require general treatment.

Browning¹⁵⁷ calls attention to the morning headache of continuous tire and exhaustion, which he regards as associated with anæmia. It is dependent upon prolonged overwork and short hours of sleep. It is most severe on waking, and improves on taking hot or stimulating drink. Other articles on headache, which contain nothing materially new, are those of Wessinger,¹ _{Aug. 8} Ravogli, ⁵³ _{Jan. 21} Zenner, ²⁷⁵ _{Nov. 10} Mason, ⁶ _{Feb. 20} and Woodbury. ⁷⁶⁰ _{Oct. 10}

Westphalen⁴ _{Nov. 27} discusses headache of gastric origin. He states that the general disturbance was due, in his cases, to an absorption of toxic material from the stomach, and that all the cases were materially benefited by hydrochloric acid.

AKINESIA ALGERA.

Under this name Möbius¹⁰⁰⁵ _{Feb. 12} describes a new disease, based upon his observation of two cases, characterized by muscular pains so severe as to produce a condition simulating complete paralysis of the voluntary muscular system. Both patients were of a decidedly nervous temperament, and the family histories showed the presence of a distinct neurotic tendency. The condition came on apparently as the result of mental overwork. At first the pains were present only after great exertion, but soon the slightest movement brought them on so that the patients refused to stir either hands or feet. In addition they were troubled with insomnia,

headache, depression of spirits and deterioration of the mental powers. Hysterical symptoms were present in the one case, but absent in the other. No indications of organic changes could be discovered, either in the central or peripheral nervous systems. The prognosis is bad, and the disease seems to be entirely uninfluenced by treatment. At present the one case seems to be slightly better, but in the other the symptoms of insanity have supervened.

ERYTHROMELALGIA.

Morel-Lavallée,³ _{July 22} reports a case in a woman which had lasted for twenty-two years. Pain was entirely absent, but there was a perfectly symmetrical congestion of the extremities, and at the same time there were symptoms closely resembling those of Raynaud's disease. Considering the absence of pain, he thinks it best to speak of the affection as Weir Mitchell's disease. A case is also reported by Garcia.¹⁷⁹ _{July 15}

NEURALGIA.

Catlin,⁹ _{July} has made, under the instigation of Weir Mitchell, an elaborate research on the relation of atmospheric electricity, magnetic storms, and weather elements to a case of traumatic neuralgia, to which reference was made in last year's ANNUAL (vol. ii, C-44). In regard to electricity, he finds that pain seeks identity with both lower positive curves and with the negative and with fluctuations of great amplitude. With such magnetic storms there is an increase of pain. During five years a comparison of the weather elements showed that an increasing temperature curve, the hours of sunshine curve, and the absolute vapor curve operate to diminish pain, while all the others are identified more or less with pain. In the monthly products for fourteen years, it appears that the depth of rain, ozone, and number of days of rain, in this order, but almost equally, constitute the best standards for pain measurement. Maximum pain bears a direct proportion to storm frequency and an inverse proportion to temperature and elastic force of vapor, and minimum pain bears an inverse proportion to storm frequency and a direct proportion to temperature and elastic force of vapor; while depth of rain accompanies the number of storms and maximum pain. The daily pain curve exhibits three pain maxima: the first at 11 A.M., the second at 2 P.M., and the third at 7 P.M.

Trigeminal Neuralgia.—Putnam⁹⁹, has reported personal observations on the pathology and treatment of neuralgias of the fifth pair. He considers that the lightning-like pains, although met with in other forms of neuralgia, are peculiarly characteristic of trigeminal neuralgia, and that in the severer forms, especially in neuralgia of the two lower branches, the pain almost always takes on this form. Supra-orbital neuralgia is usually typically intermittent, so that it used to be considered as malarial, but Putnam agrees with Weir Mitchell in doubting the malarial origin of the majority of cases. Supra-orbital neuralgia is often hereditary, and has symptoms closely related to migraine. The pain almost always appears from seven to nine and disappears about two, perhaps to return again in some degree in the evening. In the more persistent cases there is, in all probability, a neuritis, although undoubtedly changes of more or less gross character must take place in the central nervous system as a result of these violent storms of pain. He examined 10 nerves, coming from 8 patients, most of whom were operated upon at the Massachusetts General Hospital, and in all but 3 of these more or less marked changes were made out; the slighter changes, which seemed not to be incompatible with the integrity of the nerve-element, consisted of an infiltration of the smaller nerve-cells around the vessels and amongst the nerve-fibres themselves, especially in the neighborhood of the sheaths. The most extreme changes consisted in the conversion of the entire bundle into a mass of wavy tissue studded with nuclei, and scarcely containing a single nerve-fibre. In one or two cases the intima of the blood-vessels was greatly thickened and the lumen was encroached upon. In 2 of the nerves the axis-cylinders had undergone degenerative changes. In Fig. 4 the large tubes are of several times the normal diameter, and are filled only with granular myelin, sometimes with and sometimes without the remains of altered axis-cylinders. The small tubes are apparently perfect in structure, but are smaller than the usual size, and may possibly be newly-formed fibres. Between the nerve-tubes are large numbers of nuclei (b). It is possible that these very striking changes in the nerve-tubes are in part mechanical, but this is not probable. The only mechanical violence used was in removing the nerve; but the absence of signs of pressure is against this; and the presence of the numerous nuclei indicates

that inflammatory or degenerative changes have probably occurred. He believes in resection, or other surgical operation, as the treat-

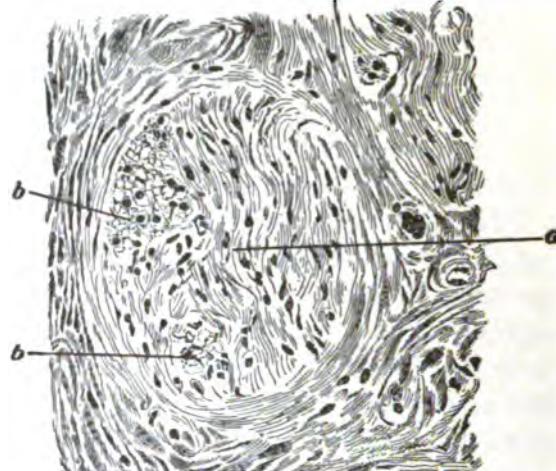


FIG. 1.—CONVERSION OF A NERVE-BUNDLE INTO NUCLEATED, WAVY CONNECTIVE TISSUE.

At *b* the traces of nerve-tubes remain, but they are very small, and apparently without axis-cylinders or myelin.
(*Medical News.*)

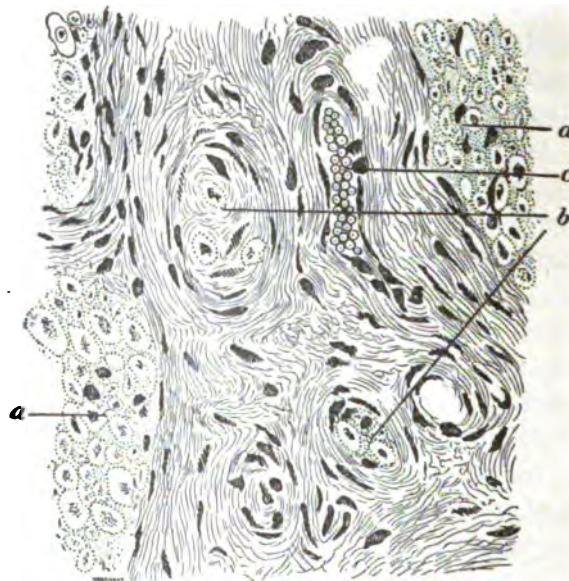


FIG. 2.

Thickened [?] septum between the fasciculi (*a*) of a nerve-trunk. At *b* are small bundles of nerve-tubes, most of which seem to have been destroyed. The connective tissue contains many cells. At *c* is a blood-vessel.
(*Medical News.*)

ment to which we should turn first instead of last, as, the earlier the operation is done, the greater is the chance for a permanent cure;

and he believes that the operation should be extreme and deep. He commends the resection at foramen rotundum and foramen ovale. Apart from surgical operations he commends aconitine, with rest and overfeeding, and points out that in many cases there may be long periods of remission. Dana⁹ also dwells upon the pathological anatomy in trigeminal neuralgia. He believes that many cases, at least, are due to an obliterating arteritis of the nutrient

vessels of the nerves, for the disease occurs at a time of life when degenerative changes in the arteries begin. It follows a certain fixed order, affecting chiefly and primarily a nerve supplied by one of the terminal branches of the internal maxillary, itself a branch of the external carotid; and it rarely affects seriously the

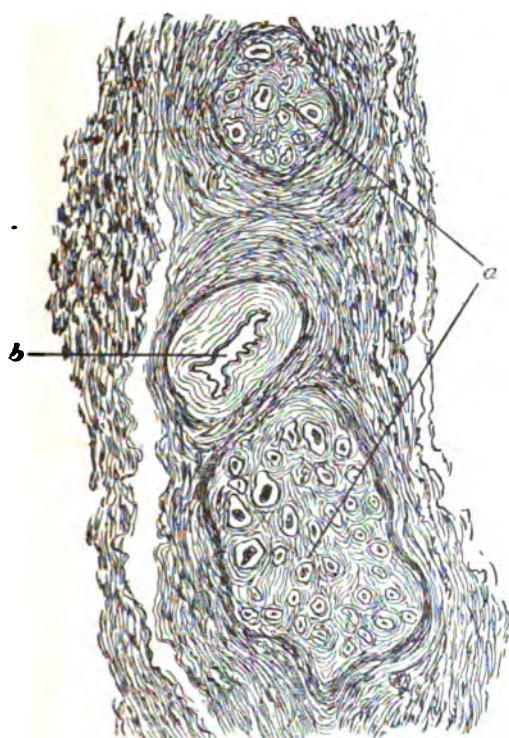


FIG. 3.

Portion of external sheath, showing the relation of small nerve-bundles (a) to the blood-vessels, b (see text). Many of the fibres of the nerve-bundles seem to have been destroyed, and their place taken by connective tissue. The blood-vessels were unusually numerous, and in some of them the intima was much thickened, and even the lumen obliterated by organized tissue.

(*Medical News.*)

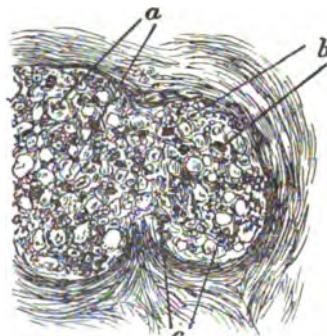


FIG. 4.—NERVE-TUBES OF LARGER (a) AND SMALLER (c) SIZE, GIVING TO THE SECTION A STRIKINGLY MOTTLED LOOK. (Drawn on smaller scale than the rest.)

(*Medical News.*)

supra-orbital nerve, which is supplied by a branch of the internal carotid. In 5 cases which he had examined there were no noteworthy changes in the nerves, but in 3 striking cases of arterial disease were found (Figs. 7 and 8). Nitro-glycerin will sometimes relieve pain instantly, and aconite and iodide, both of which have an effect upon the arterial disease, are also useful. Removal of the peripheral nerve may sometimes check the disease entirely.

Benedikt⁸⁴ calls attention to recurrence of endemic supra-orbital neuralgia in Vienna, at the period between the end of winter and the beginning of spring. He has noted this for thirty years. In most cases the disease appears in the form of peripheral neuritis.

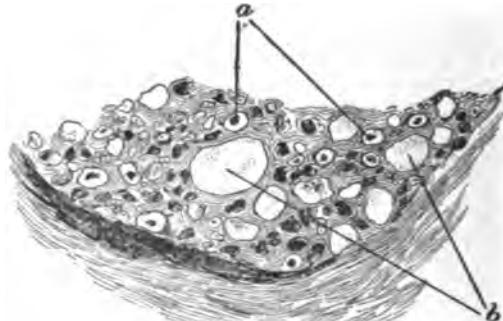


FIG. 5.—ENLARGED VIEW OF A PORTION OF FIG. 4.
a, normal nerve-fibres; b, altered nerve-fibres. Numerous nuclei occupy the space between the fibres.
(*Medical News.*)

The pain is continual during the attack. The malady has been very common and violent, affecting chiefly people who live near the Danube. The ordinary treatment by quinine, antipyrin, and

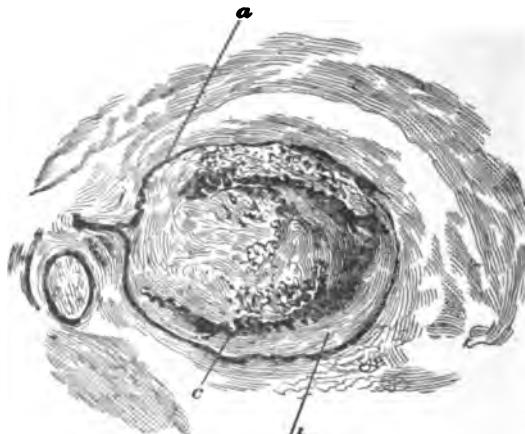


FIG. 6.—OBLITERATED ARTERY FROM THE CONNECTIVE TISSUE SURROUNDING THE NERVE AND FORMING ITS SHEATH.

a, external limit of artery; b, muscular coat, evidently altered; c, fenestrated membrane. The mass forming the centre of the artery is fibrillated and contains a number of nuclei, and is continuous with the remaining coats of the artery where the fenestrated membrane seems broken through, and also at other points. Other arteries in the neighborhood of this one, all of them of large size, are in a similar condition.
(*Medical News.*)

antifebrin gave some relief, but it caused the attack to be more violent in the end. The specific treatment seems to be the giving of iodine salts. Galvanization, also, is of great benefit. Immerwahr⁸⁵ finds that methylene blue is, under certain circumstances,



FIG. 7.—SECTION OF NERVE SHOWING INFLAMMATORY THICKENING OF THE ARTERY.
(*Medical News.*)

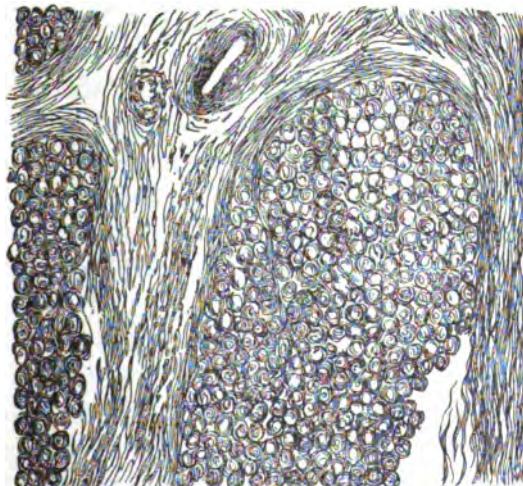


FIG. 8.—SECTION OF NERVE SHOWING SLIGHT DEGENERATION.
(*Medical News.*)

a valuable agent in relieving neuralgic pain. In sciatica it appears to be of no value, nor is it suited to other than nervous pain. He gave the drug in two 5-grain (0.32 grammes) doses, inclosed in gelatin capsules, three times a day. After prolonged use some strangury occasionally sets in, which soon yields to small doses of powdered nutmeg. Mulherbe¹²⁷ reports 2 cases of facial neuralgia. He commends subcutaneous injections of cocaine in the treatment. Le Diberder³⁶³ reports 2 cases of extreme neuralgic pain in the tongue with ulceration of the tongue, in which he suspected a malarial taint. Both were cured by doses of quinine.

Lumbago.—Latta¹¹² studies the diagnostic differences between lumbago and lumbar sprain, which he tabulates as follows:—

MYALGIA LUMBALIS.	LUMBAR SPRAIN.
Duration, five to ten days.	Duration, fourteen to twenty-eight days
Onset, sudden.	Onset, instantaneous.
Cause: Predisposition; rheumatic or gouty diathesis; exposure to cold and wet; oversatigue or slight strain of muscles in one having a predisposition.	Cause: Injury by twist, fall, direct force, or from overlifting.
Pain: Tearing or aching; confined to a single or group of muscles; aggravated by movement.	Pain: Acute, lancinating, and diffused; slight movement causes agony.
No outward signs.	Local heat; swelling, ecchymosis, and discoloration.
Rarely painful to touch; pinching affected muscle may elicit pain.	Excessive local tenderness.
No particular decubitus.	Decubitus on either side, with knees drawn up toward chin.
Heat aggravates.	Heat is grateful.
Constitutional symptoms not common.	Constitutional symptoms nearly always present.

Sciatica.—Charcot¹⁰⁰ reports a case of double sciatica, with degenerative atrophy of the muscles supplied by the external and internal popliteal. In this case he was able to exclude cancer or other disease of the vertebræ, poisoning, diabetes, or any injury of the sacral plexus; and he concludes that there may be a primary double sciatica, which is not symptomatic of any other affection, and is susceptible of cure. Mettler^{9,10} argues that sciatica is distinctly not a neuralgia, but a neuritis of the sciatic nerve. Potts¹¹² reports a case of double sciatica, which he thinks due to malarial poisoning and which yielded to appropriate treatment. Lebon¹⁵² relates a case in which there was a spasmodic contracture of the muscles of the leg, with an irregular tremor in the leg, and devi-

ation of the vertebral column. Charcot ⁷³ _{Apr. 4} describes a case due to overuse of the sewing-machine. There was atrophy of the muscles supplied by the popliteal nerve. Lamy ⁷³ _{Jan. 10} reports 2 more cases in which a lateral deviation of the spine was observed, the inclination being toward the side of the sciatica, which was of a spasmodic character. Massalongo ⁸³ _{July} points out that Vanzetti had observed the deformity of the trunk in sciatica as far back as 1850, although his observations were not published.

Eliot ¹ _{July 25} suggests that a large proportion of the cases of sciatica are due to neuritis. He commends salicylate of sodium and iodide of potassium as curative agents, and for the more purely neurotic drugs which afford considerable benefit gives aconite, belladonna, and gelsemium. Lépine ³ _{Oct. 21} and Debove ³ _{Oct. 14} report cases in which polyuria was a marked symptom, coming on with the beginning of the trouble and disappearing as it ceased. Holmes ¹¹⁷ _{July} reports a case, without autopsy, in which sciatica supervened in a case of lymphadenoma, and which led to a fatal termination. Derasse cites a case of traumatic sciatica, caused by the application of obstetric forceps. Charvot ⁸ _{Apr. 22} has obtained good success from stretching of the nerve in 3 cases of sciatica. Weir Mitchell ¹⁰¹⁸ _{Apr.} once more returns to the importance of rest by a splint and the application of dry cold over the affected nerve, sometimes associated with the actual cautery, in the treatment of sciatica. Liégeois ⁸⁸ _{July} has tried solanine without any success.

Metatarsal Neuralgia.—Bradford ⁹⁹ _{July 18} calls attention to this form of neuralgia, first described by Morton. The pain is slight at the base of the fourth toe, but in severe cases radiates up the leg. It may be of dull character, or extremely severe. It is aggravated by local pressure over the metatarsal or by squeezing the foot. The affection is due to a neuritis caused by pinching or bruising the nerve by the fifth bone. Lateral pressure brings the head of the fifth metatarsal and the little toe into direct contact with the base of the first phalanx and the head and neck of the metatarsal of the fourth toe, and by lateral pressure the nerve may readily be affected. The affection is readily detected by lateral pressure, which increases the pain. The most satisfactory treatment is by an appropriate shoe, which will put no lateral pressure upon the foot. In the severest cases an operation may be required,—the excision of the head of the fourth metatarsal bone.

Treatment of Neuralgia.—Ehrmann⁷⁶ notes the occurrence of severe facial neuralgia after the administration of iodide of potassium. Eliot¹³⁸ advocates the improvement of the general condition, especially of the nervous condition. Immediate relief is given by hypodermatic injections of morphine and similar drugs. An appropriate specific remedy, if the disease be of rheumatic or syphilitic origin, is of advantage; in other respects he recommends the use of the neurotics aconite, belladonna, and gelsemium, and the external application of counter-irritants and anodynes. Steiner¹⁴¹ claims that the use of a spray of chlor-methyl upon the affected part is preferable to the use of drugs. The application is made daily, the spray being directed on the affected part from a copper siphon, in which the chlor-methyl has been subjected to a pressure of four atmospheres. The pain is relieved at once, and, after the first week, does not return.

MENTAL DISEASES.

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GENERAL QUESTIONS IN PSYCHIATRY.

THE insufficiency of the present modes of studying insanity is strongly presented by J. Batty Tuke.²² He points out that the classification of insanity into mania, melancholia, and dementia is on a level with the former classification of dropsy into ana-sarca, ascites, and hydrothorax. We must leave the psychological basis of classification and strive for a classification based upon pathological anatomy. At present this is not attainable, but, taking etiology as a basis, we may make a great stride in advance. Insanity is not a disease. It is a symptom produced by many morbid conditions, which may arise primarily in the brain or secondarily from depraved conditions of the general system. As cases present themselves, their insanity is traceable, in something like 90 per cent., to eight great classes of causes:—

“ 1. Idiopathic morbid processes (that is, commencing primarily in the encephale itself), produced by (a) overexcitation of the cortex; (b) the subacute inflammation of general paralysis; (c) acute inflammatory action. 2. Traumatic injury. 3. Adventitious products, tumors, apoplexies, etc. 4. Secondary effects of other neuroses; epilepsy, hypochondriasis, hysteria, etc. 5. Concurrent effects on the brain of diseases of the general system; syphilis, tuberculosis, etc. 6. Toxic agents. 7. Concurrent effects on the brain of evolutional and involutional conditions; adolescence, pregnancy, the puerperal, the climacteric, and the senile periods. 8. Heredity.

“ Certain of these causes produce demonstrable changes of tissue; for example, the inflammation, the hyperæmia of over-excitation, traumatism and adventitious products, epilepsy, syphilis, toxic agents, and senile degenerations. Others presumably produce changes in the various central constituents, the presump-

tions being founded on clinical and pathological analogies. It is not that the morbid action of these causes is undemonstrable, but that they are not yet demonstrated, mainly because the conditions produced do not often prove rapidly fatal. Overexcitation of the brain is universally acknowledged as an inducer of insanity without the intervention of any other morbid factor; and the term 'idiopathic' is strictly applicable to that form of irritation the cause of which is undue exercise of the function of brain, and the effects of which are expended on the encephale. However much functional hyperæmia may be a condition of health, demands on the local circulation may be so great and so long continued, in consequence of the persistence of intellectual and especially of emotional activity, that, as in other organs, the physiological line may be passed, and pathological conditions may be induced, not confined to the vessels themselves, but extending to the tissues they supply. If the nutrition of the cells is unduly interfered with for any long-continued period of time, a series of changes ensues not only in the cells themselves, but also in the vasomotor and vasodilator control systems, which may be temporary or permanent, according to circumstances. The circulatory apparatus is adjusted to meet the increased demand; but the cells, being stimulated beyond the health limit, a condition of unstable equilibrium between nutrition and function is reached, and, consequently, instead of normal discharge of energy, irregularity of discharge is produced by the prolonged maintenance of overvascularity."

The argument cannot be pursued here at length, and, in fact, an abstract of the forcible paper of Tuke fails to give an idea of its scope and depth. Suffice it to add that he advises that the acute cases of insanity should be treated not in insane asylums, as at present generally constructed, but in general hospitals supplied with trained nurses, a staff of general physicians and surgeons, who know something about disease in general, and treated, in effect, like sick people. Asylum physicians will object to much of the criticism in Tuke's paper; but a little hard thinking upon the problems he discusses cannot fail to show the truth of his observations.

Stone⁶¹ discusses the question as to whether the gynæcologist can aid the alienist in institutions for the insane. The conclusion reached in the paper is that the attention to the physical

ailments of insane women is insufficient in the large majority of American lunatic hospitals. Whether the addition of a gynaecologist to the staff of every insane hospital would be effective in removing the objection raised is questionable, for the oculist, aurist, dentist, and neurologist would have equal claim to consideration. Indeed, the proposition has been made that the insane should be treated in general hospitals having a staff of specialists. However, nothing practical has yet come of the suggestion. It would seem to be a better plan to appoint as superintendents of insane hospitals physicians who have a good practical knowledge of general medicine and surgery. These could detect departures from physical health in the men and women under their charge, and in case of need would not hesitate to call in consultation such of their professional colleagues as have special qualifications in the various branches. Doubtless many specialists would be glad to accept appointments as consultants on the staff of insane hospitals if assured that the position were not a purely ornamental one, and that honest work would be expected. The inferential criticism in this paragraph is, that insane hospital superintendents are not such physicians as have a good practical knowledge of general medicine and surgery. I am willing to leave the decision with the asylum superintendents themselves.

Francotte³⁷⁸ Mar. 28, Apr. 5 discusses the importance of psychiatry, and points out the considerable percentage of cures obtained by proper treatment, showing, by statistics from Belgian and other hospitals, that from 40 to 45 per cent. of all insane patients admitted are cured.

V. Krafft-Ebing²⁰² Dec. 10, '70 points out forcibly the relation of psychiatry to general medicine. The question of successful treatment of insanity depends for its solution upon the general practitioner. The favorable season for the cure of a disturbed mental condition is a rather brief one, and the period during which treatment enjoys a prospect of success may be one only of weeks or of months at most. The seasonable diagnosis of such a disease is the task of the family physician, and it will devolve upon his knowledge and ability to avert unspeakable evil from his patients and their families. Hence it is the duty of the general practitioner to so perfect himself in the knowledge of mental diseases that he shall be able to aid the specialist by making an early diagnosis. Morselli,⁵⁸⁹ May of Genoa, discusses the relations of modern psychi-

try to other sciences. His field of view is much broader than Krafft-Ebing's, but his conclusions are less important to the general practitioner.

INSANITY.

Intercurrent Disease and Insanity.—Granger²⁴² has studied the effects of intercurrent acute diseases and serious injuries upon insane patients. In 2000 cases, extending over an observation period of eight years, the author had never seen acute rheumatism, but 3 cases of pneumonia, 3 of typhoid fever, and 1 of diphtheria. Sore throat was abundant, as it was usual in all aggregations of people. Erysipelas appeared from time to time. Epidemics were likely to appear. In spite of a common idea and the reports of other observers, there was little to be told about the influence of disease on insanity. The simplest common affection from which they suffered was pain, often sudden and severe. Toothache was often added, followed by alveolar abscess. It seldom produced fever. He had never seen more than temporary improvement from pain, though he believed severe toothache might produce recovery. Pain might increase all the mental symptoms, making mania more active, melancholia deeper, and even dementia more pronounced. Often it had no effect whatever, and often the severest pain seemed to be borne with indifference. Sometimes active mania was quieted and a rational and self-controlled condition approached. Melancholic patients of a decided type most often bore pain uncomplainingly, but sometimes showed marked mental improvement. In some sore throats, especially the ulcerative varieties, mental improvement of a temporary nature was always expected. The conditions were like those observed in pain, though, as a rule, more pronounced. In some chronic cases of mania, with confusion and incoherence, the patients talked rationally, while the violent were quieted and often rational. Melancholia was less affected. Dementia was almost always brightened. The expression changed; the mind was more active; the symptoms of venous congestion might partly disappear. In the cases of pneumonia observed, mental improvement occurred in one case only, but in that the change was remarkable; as soon as the disease waned, the patient relapsed into his demented state. In pneumonia, the improvement was only temporary. Out of 77 cases of dysentery, only 4 could have been said to have improved

mentally. The author thought that his observations should teach how little truth there was as to the beneficial influence of intercurrent diseases and their effect upon insanity. Considering severe injuries upon insanity, there was much more to be said in favor of the theory. The histories of 6 cases, in which the patients had jumped from heights of from 25 to 40 feet from the ground, some sustaining injuries and others not, but with marked improvement in all, were fully detailed.

Szczypiorski³⁶¹ reports a case of suicidal lypemania cured by an attack of facial erysipelas. The patient was still well six months after his dismissal from the hospital. Beliakoff⁹⁴ found, among 135 autopsies in cases of insanity, 17, or 12.5 per cent., with inflammatory affections of the ear (otitis). He concludes that lesions of the organ of hearing are often the point of origin of intellectual disorders. Walsh⁶ gives an account of 4 cases of osteomalacia in insane patients. In all there was aortic disease; 3 had borne children, and in all there had been recurrences of the insanity. E. Grabe²¹ found nearly uniformly hyperacidity of the gastric secretion in cases of mental disease, agreeing with von Noorden's, Leubuscher's and Régis's observations.

Speech Modifications in Insanity.—Séglas⁷³,⁸⁸⁶ says speech modifications in insanity may be due to three sources: 1. Disturbances of the intelligence. Ideation is erroneous while the speech function remains intact, but, as the patient expresses his ideas by words, it is through these that the mental lesion is discoverable. To these mental lesions may be added, however, speech disturbances, the speech function being altered in fashion corresponding to the ideas, whence arise verbal hallucinations. 2. Disorders of the speech function may occur without mental lesion. In this domain are to be found aphasia and dysphasias, organic and functional. 3. The speech may be modified by the disorders of expression; thus result the dyslalias. The first group is denominated dyslogias, where the intelligence is affected but the speech function *per se* is not. These intellectual disorders may result from ideation disorders or lesions of the emotions and will. The ideation disorders of speech function are divisible into four groups: Modifications in the rapidity. The discourse may be one of extreme volubility, the speech becoming very jerky; words and phrases being left out. Elliptic language. Certain patients are

affected by a true logorrhœa. In inverse cases speech may be extremely slow, amounting almost to mutism, whether due to complete arrest of thought or to the inhibition of a delusional conception. Modifications in the form of discourse follow the nature of the delusional conception and the opening may be pathetic, emphatic, rhythmical, trivial, or monotonous. Modifications in syntax. Some insane employ special terms of phrases. Others speak only in the third person. Others use only the infinitive. Others use surnames and changes in the kind of words. Modifications in the contents of discourse are shown in the employment of diminutives, syllables, or entire phrases superadded or intercalated between words (embolophrasia), abuse of pleonasms, of sentences, of puns, of stereotyped phrases, which factors throw much light on the nature of the delusion. Neologisms and paralogisms are very frequent in the language of the insane. Some are destitute of sense; others are distortions of the usual sense; others are so created as to be absurd at first hearing, but which a minute analysis show to have a delusional origin.

Insane Colony at Gheel.—Margaret A. Cleaves¹⁶⁶ writes an interesting account of the insane colony at Gheel, Belgium. Gheel was already noted as a resort for lunatics in the twelfth century. The primitive treatment was altogether religious. Gheel is the centre of a district about seven miles square, devoted to the care of the insane. The insane population is about 1700; the sane, 11,000. Nearly all the insane are distributed among the families of the cottagers in the district.

The moral environment of Gheel seems not to be of the best; although there are churches, schools, and hospitals, there are a large number of saloons—about one to every fifty of the male inhabitants. Selling liquor to patients is, however, prohibited by law. The patients are usually distributed one to a family, the pay for maintenance being classified according to the habits of the patients. The quiet and clean patients pay 84 centimes per day; the dirty, at times 94 centimes; and the dirty and troublesome, 1.10 francs per day. Private patients pay according to their means. Considerable freedom is allowed, but accidents and escapes are few. The general infirmary has room for 80 patients. When patients are sent to the district they are kept under observation from five to eight days in the infirmary, and then distributed to

the cottages. When patients are taken sick in the cottages they are returned to the infirmary.

Insanity in Childhood.—Tremoth⁸⁴ relates 6 cases of insanity in childhood, and discusses at some length the causes of mental derangement in early youth. Out of the 6 cases, 5 had hereditary predisposition. A case reported by Doernberger⁸⁵, also had neuropathic ancestry. In 1 case there was meningitis in infancy, probably producing a moderate imbecility. In 5 cases there was great anæmia or evidences of circulatory disturbance, which Tremoth regards as a causative factor. Russell⁸⁶ gives a readable account of Bourneville's management of the idiots and epileptics at the Bicêtre in Paris. Young children learn to walk with the "go-cart" or "baby-walker," which in one form or other is familiar to nearly every father or mother. The children are sent to school as soon as they are able to walk. Object-teaching is principally used. Blocks, balls, plates, strips, etc., of different sizes, shapes, and surfaces are employed to teach the pupils the elements of form, color, etc. Instruction is also given in various trades. Considerable attention is given to physical training. G. R. Trowbridge⁸⁸ arrives at the following conclusions as to the insanity of pubescence: "(1) it is a chronic mental disorder; (2) it is an hereditary psychosis; (3) it is a periodic or recurrent insanity, and also, as a rule, includes a moral perversion."

Influenza and Insanity.—Krypiakiewicz (report of Obersteiner, Vieuna, corresponding editor) observed a case of general paresis following influenza. Gauster¹¹³ (Obersteiner, of Vienna, corresponding editor) describes an outbreak of influenza in the Vienna Insane Asylum. Of the male patients, 11.3 per cent., and of the female, 17.5 per cent. were attacked. Among the attendants and employés, 40 per cent. were affected. In the colony at Kierling, the inmates were attacked in 23.8 per cent. and the attendants in 42.5 per cent. of the whole number.

Clouston²⁰⁷; ²²⁴ discusses the production of melancholia as a sequel of *la grippe*. An examination into the character of cases admitted during that period (1889-90) demonstrated two marked facts: First, that the general health of the patients admitted was much lower than usual, 50 having been admitted "in bad health and very exhausted condition," i.e., in imminent risk of death, as compared with an average of 38 during the fifteen pre-

vious years. The other prominent fact concerning the admissions during the year was this: In the two chief divisions made of the mental conditions of patients, mania and melancholia, the number of cases of melancholia more than equaled those of mania, there being 140 of the former against 134 of the latter. This is contrary to the usual rule, as mania commonly predominates. During the five years previous, 847 cases of mania were admitted to 617 of melancholia, or 37 per cent. more cases of mania. In no previous year in the history of the institution had the number of cases of melancholia exceeded those of mania. Not that melancholia was a less common form of trouble than mania, if all who suffer from it are taken into account. In his experience the contrary was true; but much melancholia was never sent to an institution, and did not need to be sent. From his observation he had concluded that the year 1890 was, with them in Edinburgh at least, depressing in its conditions to the nervous tone and lowering generally to human vitality. Whether it was the influenza in the early part of the year that perceptibly lowered human vitality as a whole, or whether its presence merely showed that European humanity was in a lowered state of vitality, thus being a fit nidus for the influenza germs to propagate in, or whether it was the sunless, summerless general character of the year, he could not tell.

Clouston distinctly connects the increased number of melancholiacs with the influenza in some way. His experience, with that of medical *confrères*, he states, went to show that a considerable number of influenza patients felt great mental depression, both during and after attack had passed off, often for months. If a few with a tendency to insanity, of the thousands who were simply depressed in mind, became insane, the increased number of melancholiacs would be accounted for. In his opinion the subsequent lowered nervous tone left as an evil residuum long after the disease had been recovered from had not had the attention paid to it that it deserved. He believes that the epidemic of 1889-90 left the European world's nerves and spirits in a far worse state than it found them, and that they had scarcely yet recovered normal tone. The influenza poison seemed to burn up the nervous energy and leave the brain unable, in some cases, to recuperate.

Hallucinations. — Lane⁹⁹ has studied the frequency and character of hallucinations in 307 cases of primary insanity coming

under his observation. The following table shows how the various hallucinations were distributed among the different diseases:—

	Hearing alone.	Sight alone.	Smell or Taste.	Hearing and Sight.	Hearing, Sight, and Smell.	Hearing and Touch.	Hearing, Sight, and Touch.	Sight and Smell.	None.	Total.
Paranoia	38	1	1	18	5	2	1	1	5	67
Acute melancholia .	32	5		9	4				5	55
Acute mania	15			3					20	38
General paralysis . .	9	2	1	3					19	34
Post-paralytic insanity		1		2					7	10
Other organic brain disease	3			2		1*				6
Epileptic insanity . .	4	4		2						8
Insanity of pubescence	4			2					5	11
Katatonia	2			2						4
Hysterical insanity .				1					5	6
Senile insanity	6	5	1	2	2				16	29
Alcoholic insanity . .				2						3
Recurrent mania . . .				1					3	4
Folie de doute	1									1
Simple mania									2	2
Simple melancholia . .									10	10
Folie circulaire									7	7
Senile dementia									6	6
	114	19	2	47	10	2	1	1	111	307

* And touch.

It will be noted that hallucinations were present in every case of paranoia, in 90 per cent. of the cases of melancholia, in nearly 50 per cent. of acute mania, and in 44 per cent. of general paralysis. In organic brain disease, epileptic insanity and senile insanity, the proportion varied from 40 to 50 per cent.

In comparing other statistics with those of Lane, the reader must bear in mind that Lane makes no distinction between hallucinations and illusions.

Insanities Due to Traumatic or Toxic Causes.—Lloyd and Tull⁹ report cases of acute delirium without recognizable cause. Lloyd seems to lean to the view that many of the cases are infective in nature,—a view that appears to me to have much in its favor. In Tull's case the patient's temperature before death rose to 103.4° F. (39.7° C.). The autopsy "revealed a condition apparently of incipient meningitis." Although there were vague symptoms referred to the bladder, there seems to have been no

attempt to search for any local pathological condition outside of the skull. Chapin, in discussing Lloyd's cases, somewhat timidly agrees that, other theories having failed to account for the origin of the disease, Lloyd may perhaps be correct.

Hay²³⁴ reports 11 cases of insanity due to injuries of the head, and draws the following conclusions: (1) that injuries to the head are more frequently followed by mental disease than text-books generally admit; (2) that the majority of these cases of insanity are unattended by epileptic convulsions; (3) that traumatism may produce, in previously healthy subjects, any form of mental disease, except, perhaps, general paralysis of the insane, which did not occur in any of the cases referred to; (4) that the prognosis is much worse in those cases which arise remotely from the reception of the injury.

Le Dentu²³¹ and Kiernan¹⁸⁹ discuss post-operative delirium or insanity, pointing out the comparative frequency with which operations on the female pelvic organs are followed by these mental disturbances. No satisfactory explanation of the mental disorder has been offered. Alexander¹⁸⁸ reports a case of post-eclamptic mania. The case (I-para) was admitted into the Edinburgh Maternity Hospital in a comatose state, three and a half hours after delivery. She had had three convulsions; urine albuminous and containing tube-casts. After admission eight more convulsions, and then furious mania of short duration. Pulse and temperature elevated; temperature remaining at 102° or 103° F. (30.9° or 39.5° C.) for two weeks, ascribed to septic infection. The author says in his epicrisis that "the maniacal outbursts might be looked upon as having for their predisposing cause congenital mental instability, and for their exciting cause the epileptiform fits." It seems more rational to connect the mania with either the kidney disease or the septic infection.

Jolly¹⁰⁸ reports 3 cases of mental derangement following the use of tuberculin. The form of disorder encountered in these cases was delirium and delusional mania. The disturbance was temporary, only continuing several weeks, being started by the pyrexia, but continuing when the temperature decreased. Korsakow and Serbski³⁸⁸ report a case of polyneuritis with mental disturbance in a woman in whom a laparotomy had been done for suppurating extra-uterine pregnancy. Degenerative lesions were found in the peripheral nerves and an increase of connective tissue in Goll's

columns and the lateral columns of the cord. No alterations could be detected in the brain.

Tomlinson²⁴² reports 6 cases of hysterical mania, cases constituting a symptom group, which he believes warrants their separation under the designation "hysterical mania or maniacal hysteria." This form of mental disturbance is "characterized by exaltation, sometimes varied by depression, varying degrees of violence, irrational conversation, with or without hallucination, and without delusion; accompanied by exaggerated conduct, the actions of the patients being purposive and suggested, and governed by their surroundings." Three conditions present separate hysterical mania from simple acute mania, or mania with delusions. They are: retention of memory, absence of mental perversion, and purposive conduct. The author thinks this form of insanity is on the increase in this country.

Acute Mania.—Willerding²⁴³ gives the following conclusions upon the prognosis of acute mania: (1) about 70 per cent. of all cases of acute mania are cured after running a course averaging several months; (2) early treatment in insane hospitals has a favorable effect upon the course of the disease; (3) a family history of insanity does not necessarily make the prognosis unfavorable; (4) cases of mania occurring as sequelæ to disease—alcoholism or pregnancy—have a favorable prognosis, both as regards duration and ultimate cure; (5) cases due to slight injury of the head usually recover; (6) the return of the menstrual flow accompanying an improvement in the mental condition is an indication of a speedy return to health; (7) the younger the patient, the greater is the hope of recovery; (8) recurrent mania presents a bad prognosis for complete and lasting cure; (9) where the disease is of long standing the probability of recovery is poor; (10) the sudden onset of great maniacal excitement is an unfavorable symptom except in those cases following pregnancy or traumatism of the head; (11) sudden stoppage of the maniacal excitement must raise the fear of recurrent mania or of early relapse; (12) great increase in weight before the beginning of the quiet stage must be similarly interpreted; (13) the more severe the attack, the poorer is the prospect of complete recovery; (14) paralysis and convulsions must be looked upon as grave complications. Whitwell,¹⁰⁶ in a suggestive paper on the pathology of sudden death in mania, sum-

marizes his views as follows: 1. A not unfrequent cause of sudden collapse, which may or may not result in death in cases of mania, is fat-embolism of the lung. 2. That it is to be suggested or diagnosed during life by the presence of the following points: (a) sudden collapse, with coldness of extremities, etc.; (b) dusky pallor of face, sometimes marked cyanosis; (c) some dyspnoea, —respiration may be shallow, sighing, or labored; (d) pulse of fair volume frequently, usually irregular; (e) stethoscopic examination revealing pulmonary oedema, or secondary embolic pneumonia. 3. That it is to be suspected after death by (a) the observation of intense local oedema of one or both lungs; (b) the occurrence of actual infarcts in the lung; (c) the presence of localized pneumonia, which may or may not be associated with infarcts. 4. That the actual source of the fat is not at present known. 5. That fat-embolism of the lung can occur in these cases without any discoverable injury to either bone or subcutaneous tissue. 6. That it may possibly be due to a change in the blood, brought about by the long-continued maniacal excitement.

Melancholia.—Riggs²² has an interesting paper on melancholia, pointing out, especially, its frequent relations to Bright's disease, glycosuria, and lithæmia. His therapeutic measures are overfeeding, massage, out-door exercise, hypnotics if insomnia is present, and opium. Ox-gall and cascara sagrada are useful adjuvants.

Sollier¹⁵² has found constantly an increase of electrical resistance in melancholia. It is of diagnostic value and of prognostic significance, for its diminution and approach toward the normal resistance is the forerunner of improvement in the mental state. This observation is confirmed by Séglas.³⁸¹

Cullerre⁸ reports 2 cases where arrest of hypodermatic injections of morphine in melancholia resulted in such rapid abatement of the symptoms as to be almost magical. The relief was not merely temporary, but complete and permanent.

GENERAL PARESIS.

As for several years past, much attention has been paid to general paresis. Articles upon the subject generally have appeared from the pens of Folsom,⁹⁹ Trowbridge,⁹⁸ Savage,²² Lloyd,¹⁹ Boeck,²⁷⁶ and Kindred.⁸¹ The lectures of Savage and Lloyd give a good general picture of the disease, while Trowbridge

analyzes 90 cases from the records of the Danville Insane Hospital. Nothing new is added to our knowledge of the disease by these papers. Folsom confines his remarks to classification, pathology, and diagnosis. He believes with Mendel that syphilis is an antecedent in about 75 per cent. of cases.

Pathological Anatomy. — Zagari⁷⁵ examined five brains of subjects dead from general paresis. He found, contrary to Lissauer (see ANNUAL for 1891, vol. ii, D-13), no regularity between the degenerations in the optic thalami and the focal symptoms manifested during life. In 3 of the cases the focal symptoms during life and the degenerations found post-mortem coincided; in 1 of the cases there were no symptoms and no degeneration, and in another no symptoms, during life, but foci of degeneration found after death.

Keraval and Targowla^{73, 74} found degeneration and disappearance of the cortical fibres in general paresis as well as in other forms of advanced dementia. No relation could be discovered between the disappearance of the fibres and meningitis. The wasting of the fibres is most noticeable in the frontal lobe and the gyrus rectus.

Etiology. — The discussions of the last five years have apparently settled the question of the luetic origin of general paresis in the affirmative. The question now being actively debated is the influence of alcoholism in the production of the disease. At the Lyons Congress of French Alienists^{8, 99} Aug. 5, 18; Sept. 10 an elaborate report was read by Rousset, who concluded that alcoholism may produce connective-tissue proliferation and sclerosis, and may thus induce general paresis. He attributes, however, an equal importance to predisposition.

Magnan defended the view propounded in his well-known work, namely, that chronic alcoholism leads habitually to dementia, and sometimes to general paralysis; this view being supported by arguments borrowed from experimental physiology on the one part, and from clinical observation and pathological anatomy on the other. Experiments on animals subjected to chronic alcohol poisoning give, as result thereof, steatosis of the liver and kidneys; sclerosis of the pericardium, of the meninges, and of the posterior columns of the cord. In man, similar lesions are noted as the effect of prolonged alcoholic excesses; the morbid process localizes

itself in accordance with individual predisposition, and when it affects the cerebrum it determines the symptoms of dementia.

Régis stated that he had formed his opinion from data obtained in the private asylum of Castel d'Andorte. He finds that in the middle classes of Gironde cases of general paralysis and of alcoholism are in absolutely inverse proportion, and that in this region, at least, alcoholism has no influence on the production of general paralysis. On the other hand, almost all cases of general paralysis are old syphilitic patients; and this leads him to assign an important rôle to syphilis as an etiological factor in general paralysis.

Marie, of Paris, regards ordinary toxicological agents (mercury, lead, opium) as factors of no account in general paralysis. Nor do the infectious poisons (those of acute diseases) seem to have any influence in the genesis of this disease. Syphilis, on the contrary, as a chronic infectious process, has been found to be pathogenic in 65 per cent. Alcoholism and syphilis combined, associated with heredity, seem to form a sort of triad with predominant etiological influence. So impressed is this authority with the importance of heredity that he regards general paralysis rather as a degenerative affection of the race than of the individual.

Combemale, of Lille, stated that he had induced in dogs the characteristic symptoms and lesions of general paralysis by dosing them with daily quantities of alcohol, introduced by the stomach-tube; these experiments were made in conjunction with Mairet. These are his conclusions: 1. Chronic poisoning by alcohol gives rise, in the dog, to outbreaks of delirium characterized especially by ideas of fear, with hallucinations. 2. To these symptoms, which generally mark the onset of the psychical troubles, are shortly added mental enfeeblement and muscular disorders, both ataxic and paralytic, which begin by the posterior extremities, or at least have their maximum there, and rapidly become general, as in general paralysis. 3. At the autopsy of the animals are found the principal lesions which characterize general paralysis: diffuse meningo-encephalic inflammation and vascular dilatation. 4. To the nervous disorders of the limbs are to be added certain choreiform tremblings of the head and neck and modifications of character and of instinct; thus, an animal of snappish, churlish disposition would become mild-mannered and tolerant of excitation.

These physical and mental disturbances were thought to justify the diagnosis of general paralysis of special form.

Christian thought that it would not do to give to the morbid accidents noted in the dog by Combemale the name of general paralysis. They simply show that alcohol causes, in the dog, delirium and paralysis. With this opinion Mairet coincided. He believes that alcohol may determine, in man, the appearance of a special form of general paralysis quite distinct, clinically and anatomically, from ordinary general paralysis.

Magnan did not dispute that alcoholism gives to general paralysis a special physiognomy, which results from the distribution of the lesions. But this is no reason for creating a special form of general paralysis.

Charpentier affirmed that hospital statistics have proved that it is in alcoholic patients that general progressive paralysis acquires its maximum of frequency. In the last five years he has found, at Bicêtre, 83 cases of confirmed alcoholism out of 135 victims of general paralysis. If general paralysis of alcoholic origin takes on a special form, this is due to the nature of the intoxicant, its affinities for particular tissues, and the kind of irritation it provokes.

From an anatomo-pathological point of view, alcohol poisoning may produce the entire symptomatic complexus known as progressive general paralysis, and at the autopsy one may fail to find the characteristic lesion of general paralysis; that is, diffuse interstitial sclerosis. *Per contra*, there is no diffuse interstitial sclerosis without general paralysis, while there may be general paralysis without this anatomical lesion.

From the foregoing discussion, it will be seen that pathologists have not yet, with sufficient precision, defined the pathological anatomy, the symptoms, and the course of that morbid entity designated under the name of general paralysis; and till this is done, as was remarked by one of the speakers at the meeting, the question of the rôle of alcoholism in the etiology of general paralysis cannot be satisfactorily answered.

A confirmation of the view generally held among alienists, that syphilis, alcoholism, and debauchery have very decided influence in the production of general paresis, seems to be furnished by the statistics of the relative frequency of the disease among the laity and ecclesiastics. Bouchaud⁶⁸⁵ has found that, in several

insane hospitals in France, the average proportion of general paralysis to all forms of mental disease, excluding epilepsy, idiocy, and imbecility, is, among the laity, 1 to 13.5, while among the clergy it is only 1 to 47.2. Jacobsen^{2088; 886} finds a decided increase in the cases of insanity in women. Syphilis and alcoholism are important factors in the causation.

Complications and Exceptional Symptoms.—Rey³, reports 2 cases of general paresis complicated by diabetes. In the first case the diabetes was a symptom of cancer of the head of the pancreas. In the other case treatment directed against the diabetes resulted in an improvement of the patient in both physical and mental affections. Fétré³,₁₁ reports a case of general paralysis with epileptiform attacks, in which each convulsive attack was preceded by an abundant flow of saliva. The salivation occurred under no other conditions. Janin²⁰⁹⁹ reports 194 deaths from general paresis during seven years at Charenton. The causes of death were as follow: Paralytic marasmus, 85; epileptiform attacks, 58; apoplectiform attacks, 22; choking from food, 3; internal strangulation, 2; suicide, 1; rapid phthisis, 1; various other causes, 22. Vallon³,₁₁ reports cases of sudden death during general paresis, in which no lesions to account for the death could be found on post-mortem examination. He points out the importance of being aware of this termination in a medico-legal point of view. In the discussion of these cases before the Medico-Legal Society of Paris, reference was also made to similar sudden deaths during delirium tremens.

Koenig³ reports a case in which the typical symptoms of general paresis were present, with the exception of the usual disturbance of speech. In place of this there was occasional aphonia, lasting a few seconds, followed by a short interval of stammering, when the speech would again become normal. Cottam⁶,₁₁ reports a case of general paresis with "crossed reflexes." An exceptional form of general paresis is that termed "circular paresis." Gilles²⁷⁸,₁₁ has studied the disease and offers the following conclusions: 1. Circular paresis is entitled to a place amongst the other clinical forms of general paralysis fully as much as the other symptomatic varieties. It bears the same relation to circular insanity as the ambitious and hypochondriacal forms have to the simple insanities (mania and melancholia). 2. This clinical type appears more especially when general paresis is developed in an individual pre-

disposed to insanity by the laws of progressive morbid heredity. 3. Remissions are more frequent than in the other forms of paresis; they constitute the lucid intervals separating two opposite phases of the disease. 4. The progress of the disease is very irregular. We often observe the retrocession of the most pronounced morbid symptoms, and the patient who appears to be in the least degree of organic or mental decrepitude undergoes a veritable mental and physical renovation. This metamorphosis appears most prominently in connection with the development of one or the other phases of the disease. It is especially, however, in the melancholic period that we observe the intellectual and organic failure with trophic disorders. In the expansive period there is, on the other hand, more likely to be a temporary amelioration. 5. Certain conditions appear to favor the transition of one phase into the other (production of an eschar, congestive attacks, return of the menstrual period, invasion of an acute disease, etc.). 6. Circular paresis may appear suddenly after one or more attacks of simple insanity, or in the course of a true circular insanity. 7. It terminates almost invariably with death. Recovery is altogether exceptional, not to say hypothetical. 8. We meet, in this circular paresis, with the different types of circular insanity. Many of these types may succeed each other in the same patient in the course of the disorder. The alternating form of J. Falret is more frequent in the paretics than in the simpler forms. 9. The succession of opposite phases is sometimes interrupted by the progress of the dementia, and the symptoms become mingled in the greatest disorder. 10. In the majority of cases the duration of the disease is much longer than in the ordinary forms of paresis. 11. The circular general paresis presents certain diagnostic symptoms that permit it to be differentiated from the other forms of the disease and from circular insanity.

Obersteiner, of Vienna, corresponding editor, has found that only about 15 per cent. of general paralytics have hallucinations. He has also found that the mortality is greater in winter than in summer.

HYSTERIA.

Trophic Disturbances in Hysteria.—Pitres,⁷⁸ says that up to recent years hysteria was not supposed to give rise to trophic disturbances. Oedema, however, shows itself often enough in hys-

teria, but rarely without some motor disturbance. The following case was unaccompanied, however, by any such trouble: Case I. Occurred in a girl aged 20 years. The swelling, which dated, with an intermission, from two months before, affected the left foot and leg. It did not pit on pressure, and was worse at night. There was analgesia of the left side of the head, and the field of vision was concentrically limited. There were other evidences of hysteria, including a rapid cure after the application of a magnet. This neuropathic œdema is due to vasomotor paralysis. In the next case the opposite condition (vasomotor spasm) was present: Case II. Woman, aged 25. There was a flaccid paraplegia which had come on after an abortion. There was total anæsthesia of the feet and legs. When pricked these parts did not bleed, and the surface temperature was only 25° C. (77° F.). The onset of the paraplegia after a mental shock, the absence of atrophy, the distribution of the anæsthesia, the intact condition of the rectum and bladder, the concentric limitation of the field of vision, and the mode of cure showed the hysterical nature of the disease. The next case, Pitres says, is one of primitive hysterical atrophy: Case III. A man aged 23. The left upper extremity was affected with a well-marked muscular atrophy, and the hand showed a well-marked claw. The atrophy began five years before. There were large patches of hyperæsthesia over the upper part of the trunk, head, and right arm. The mucous membranes were also hyperæsthetic. The fields of vision were very limited. The diagnosis is important, inasmuch as if the disease is hysterical in nature the patient will recover. Case IV. This is an example of diminished electric reaction to galvanism and faradism. It occurred in a hysterical patient, aged 46, who had right facial paralysis. The muscles raising the lower jaw were, however, rigid. It ended in recovery. Case V illustrates the fact that these trophic changes may end in destruction of tissue. It occurred in a woman aged 25. She had suffered from several attacks of paralysis, lasting for a varying period. Now she has right hemiplegia and hyperæsthesia of the skin and mucous membranes. Concentric limitation of the fields of vision and occasional convulsive attacks. Three years ago she had œdema of left cheek and gums, and without suppuration the molar teeth fell. These teeth were not carious. Pitres admits that the fact of this condition not having been seen is a

serious objection, but he thinks there is nothing improbable about it.

Oulmont and Fouchard⁸¹, report cases of trophic disturbances in hysterical subjects. Their first case exhibited nearly all the trophic symptoms possible. There were hystero-epilepsy, convulsive attacks, hemiplegia, with exaggeration of the reflexes, and spinal epilepsy. Vasomotor disturbances, muscular atrophy, œdema, contracture with athetotic movements, deformity of the phalangeal articulations, brittleness of the nails, eczema, and transitory amaurosis. The case recovered, under the influence of magneto- and hydro- therapy.

Raymond^{82, 83}, reports a case of ecchymotic spots and pemphigoid eruptions of hysterical origin. The ecchymoses appeared after a convulsive attack, and have persisted during two years. The pemphigoid eruption is upon an anæsthetic and paralyzed limb, and was not preceded by any malaise or elevation of temperature. Richardière⁸⁴, also reports a case of bullous eruption of hysterical origin.

Blue Cœdema.—Charcot has called attention to an œdema with bluish discoloration, which at times occurs in hysterical subjects. A case is reported, ²⁴ in a single girl of 22 years, in which a bluish or violaceous, firm tumefaction was observed on the back of the hand and wrist. There was also great depression of the temperature, amounting to 5° C. (9° F.). The affection resembles, in some respects, Raynaud's disease, but is not symmetrical, like the latter, and does not lead to gangrene, as Raynaud's disease does. Boix⁴⁶², gives the history of an interesting case of this hysterical manifestation. The patient is a male cook 35 years of age. Until he was 14 years old he constantly wet his bed. His present attack of blue œdema is the fourth. He is a blonde, with blue eyes and a feminine expression. The entire right side is anæsthetic,—an area at the level of the right scapula being almost completely devoid of sensibility. The visual field is contracted on both sides, but more marked on the right. The patient's right hand is markedly œdematosus, with a bluish, marbled appearance. The depth of color varies, being usually deeper in the evening. The swelling is hard, slightly pitting on pressure, but the depression is rapidly obliterated with return of the discoloration. The difference in temperature between the affected and the sound hand

varies greatly. At times the discolored hand is colder, at others warmer. The sweat-secretion in the right axilla is much increased. The position of the hand is that of fixed flexion upon the forearm. The muscles are in a state of contraction, but with a little force the hand may be extended; yet the latter immediately resumes its flexed position on removing the resistance.

Hysterical Fevers.—Boulay¹⁰⁰ See p. 22, n. 10. gives an account of what he and other observers, principally French, term *hysterical fever*. A summary of the paper is subjoined, though the diagnosis should be accepted with caution. It is more likely that in most cases some local nutritive disturbance is the source of the elevation of temperature.

Boulay divides cases of fever of hysterical origin into two well-defined groups. In the first group the pyrexia is the principal, if not the only symptom. The fever runs its course without the occurrence of any other pathological state. In the second group, much the larger, are included cases where the rise of temperature is associated with other hysterical phenomena, which simulate more or less some visceral lesion. These cases are, in practice, the most puzzling. The cases in the first group, those of hysterical fever properly so called, are characterized by extreme irregularity in the course of the fever. No two charts are alike. The course is at times continued, with or without evening exacerbations; at times it is remittent, or it may be intermittent. The thermometer may rise above 106° F. (41.1° C.) in some cases. The duration varies from a few weeks to several months or even years. In all cases defervescence is rapid. The patient is cured suddenly. The general phenomena accompanying the pyrexia vary in different cases. Sometimes they may be completely absent; even the tongue may be perfectly clean, and the pulse, skin, and subjective sensations of heat may bear no relation to the rise of temperature. In other cases there may be present the usual concomitants of fever, headache, digestive disturbance, etc. The most remarkable fact, however, is the absence of wasting. After long-continued high temperature, there may be no loss of weight. Nervous symptoms, of the kind generally associated with hysteria, make their appearance sooner or later in the case. Not unfrequently they take the form of convulsive seizures. In the second group Boulay describes forms of hysterical fever which simulate typhoid fever, pneumonia,

asthma, pulmonary tuberculosis, meningitis, peritonitis, and intermittent fever. Fever simulating enteric fever may set in, after, perhaps, some mental shock, with elevation of temperature, diarrhoea, dry tongue, and dullness of intellect. The diagnosis is difficult, and can only be made on the occurrence of the hysterical phenomena. A sudden onset after some emotional cause will put one on one's guard. Hysteria is well known to simulate meningitis. The slow pulse, headache, vomiting, constipation, retraction of the abdomen, and all the symptoms are present, except elevation of temperature. But even this last symptom may be present, and the picture of meningitis, especially of tubercular meningitis, may be complete. The only signs wanting—at least, in the hitherto-recorded cases—are the partial paralyses. The diagnosis is very difficult, especially in the case of children. Haemoptysis, cough, dyspnoea, and intercostal pains are often of hysterical origin, and are, as a rule, easily recognizable. It is only when these symptoms are associated with a rise of temperature, also of hysterical origin, that the diagnosis is difficult. Most physicians also have observed cases of hysterical peritonitis. One symptom alone is usually wanting, namely, elevation of temperature; but even this may be present. In the treatment of hysterical fever antipyretics have no place. The treatment is identical with that of other neurotic disturbances. As to the pathogenesis of hysterical fever, it is only natural to seek an explanation of the phenomena in some nervous derangement. According to modern views all fever can be traced to a derangement of the nerve-centres which control the production of heat, especially in the muscles, which represent the chief thermogenetic apparatus. Certain heat-centres exist in the cortex, and others in the corpus striatum, optic thalamus, and medulla. These lower centres stimulate the production of heat, whereas the cortical centres control the action of the lower centres. In hysteria one would be more inclined to suppose a paralysis of the cortical inhibitory centres rather than excitation of the heat-producing centres at the base of the brain.

Szabó ⁶ reports a case of fever in a hysterical subject in which no local cause could be detected. The history of the attack is described as follows: "Except the right hypochondrium, no part of the body was painful on pressure, but there was frequent formulation in the right lower extremity. She could not walk or raise

her right leg. Then there was an attack of fever, complicated a month later with the menses, which began with violent abdominal pains. The temperature at 1.30 P.M. was 38.9° C. (102° F.). A violent hystero-epileptic fit then occurred, which lasted twenty-three minutes. On the following day at the same time the temperature was 38.5° C. (101.4° F.) and the pulse 92. On the next day the temperature was 39.1° C. (102.4° F.), with singultus for twenty-three minutes. The next day the temperature was 39° C. (102.2° F.), the pulse 150, and the respiration 52. These paroxysms of fever lasted two weeks, without any other change in the organism than an increase of urea." Perhaps careful pelvic exploration would have discovered a cause for the fever besides the hysteria.

Massalongo⁵⁸ gives a good summary of recent and older literature on toxic hysteria. Saundby⁶ reports a case of hysterical spastic hemiplegia, in a man aged 37, due to lead poisoning. He gives the following as diagnostic points in the case: 1. Primary spastic hemiplegia is unknown as a disease of adult life; there is no history here of an apoplectic seizure, but of a slowly progressing paralysis. 2. There was analgesia of the affected forearm; whereas in organic disease sensation would be unaffected. 3. The gait differs from that of organic disease in the foot, being flexed instead of being extended in the talipes equino-varus position. 4. The spasm is not constant; when standing he can point his toes and flex his knee. 5. Very slight wasting has occurred, in spite of the paralysis having existed more than eighteen months. 6. The spasm relaxed completely under chloroform, and has not recurred at the wrist and elbow. 7. The continued improvement which has taken place under simple treatment.

Hysteria in the Male.—J. Michell Clarke^{6, 59} relates four cases, in one of whom there was extensive hyperesthesia of the anterior surface of the body. The subject was 11 years of age; no neurotic family history. The notable symptoms were as follow: For a week general malaise, loss of appetite, and headache. There was alternating, almost rhythmic contraction and dilatation of the pupils. Pain was complained of in the praecordial region, and there were constant movements of the left arm, in which the forearm was first extended and then flexed and pronated so as to bring the hand forcibly against the praecordia. The

patient now passed into a semi-conscious state, refused all food, passed his urine and faeces into the bed, and would not speak. Movements of the arm became feebler. Irritation of praecordial region caused screams and cries, followed by tonic spasms of the limbs, passing into opisthotonus. Hyperaesthesia extended over entire anterior surface of the trunk. For three weeks all food was refused. No disease of thorax or abdomen could be discovered. No muscular atrophy and no paralysis was present. Fundus oculi and disc healthy; strong spasm of orbicularis. Attention could not be attracted, although the slightest touch of the hyperaesthetic area caused cries. Patient entirely recovered in three months.

A second case presented frequent convulsive seizures, optic neuritis, loss of power of locomotion, and contractures of the lower limbs. There were other signs which indicated the presence of an intra-cranial lesion. After about a year, the patient, also about 11 years of age, was admitted into a hospital, where he soon recovered, although the defective vision was not much improved. In the third case there was spasm of the right foot, following an injury twelve months previously. Complete recovery in two days, after application of a strong faradic current. The fourth case was one of contraction of the right forearm and hand. The diagnosis in the second and fourth cases does not seem to me established.

Bitot²¹² has observed 22 cases of male hysteria in the course of four years in a ward of thirty-eight beds. Curiously, most of these patients were robust, vigorous men, quite able to follow their occupations. Kern⁵⁷ reports 5 cases in German soldiers.

Charcot⁹⁴ relates a case of hysterical anaesthesia of the middle and lower branches of the fifth nerve. The patient, a man of 24, had a history of hereditary impression, superimposed upon which were alcoholism and traumatism. The visual field was concentrically contracted in both eyes. The patient was easily thrown into violent typical hysterical convulsions. There was no hemiplegia. There was disturbed sleep, dreams of falling over precipices, violent cramps in the legs, and tingling in the hands and feet.

Symptoms.—Charcot⁹⁴ reports a case of hysteria simulating the symptoms of Weber (right hemiplegia and left ptosis). The case is one of a young woman of 18, who presented herself at the Salpêtrière suffering from right hemiplegia and left ptosis,—a combination of symptoms which would point to an organic lesion of

the lower and inner part of the cerebral peduncle, and which has not hitherto been observed in hysteria. The onset of the hemiplegia, four years previous to the time of observation, was gradual and without appreciable cause, and it was succeeded one year afterward by exquisite hyperesthesia localized in the right side of the body, and especially in the neighborhood of the joints. At the end of a few days these arthralgias improved, and gave place to hemianesthesia and complete right hemiplegia, which confined the patient to bed for ten months. The paralysis gradually and spontaneously disappeared in the course of a year. The ptosis had developed gradually without any known cause two years previous to the onset of the paralysis, and had persisted without any notable modification. Notwithstanding the apparent gravity of the co-existence of ocular symptoms of one side, with motor troubles of the opposite limbs, Charcot expresses his conviction that the condition is one of hysteria, and predicts a complete cure. The dropping of the lid of the affected eye is held to be due not to paralysis, but to spasm, even though some of the usual symptoms of this latter condition were absent,—such as vibration of the lid and resistance on attempts being made to open it; pronounced wrinkling from contracture and spontaneous tremors, increased by voluntary attempts to open the eye. The signs present in this case indicative of spasm were a relative lowering of the eyebrow of the affected side, not disappearing or wrinkling the brow, and accentuated during attempts to open the eye widely; more pronounced wrinkling of the brow on the healthy side; the presence above the dropped lid and toward its nasal end of two or three vertical corrugations,—one of which very distinctly limits a small, rounded depression. The result of these various contractions is to give to the physiognomy a sad and disappointed air. Alt ³⁴ _{Ap. 7} reports 2 cases of hysterical contraction. The first was a lad of 15, who had a fixed flexion of the first joint of the left ring-finger. By gentle manipulation the contraction was overcome. The second case was a girl of 17, with great rigidity of the entire muscular system. The mouth was spasmodically closed, the head thrown strongly back, the closed fists were pressed against each other and against the chest, the abdomen retracted, and the lower extremities stiff and extended. The eyelids, however, were in a constant state of vibration. The patient refused to eat, and soiled the bed,

but several cold baths and subsequent faradism had a beneficial effect. Glatz²¹¹ reports a case of hysteria, in a Jewess aged 40, simulating Jacksonian epilepsy. Gilles de la Tourette²³ reports 5 cases of hysteria simulating facial neuralgia and Ménière's vertigo.

De la Tourette and Cathelineau²³ have determined, by analysis of the blood in 10 patients, that in ordinary hysteria the bodily nutrition is not interfered with. There was no change in the amount of haemoglobin, urea, or glucose, nor in the number of red corpuscles.

Brissaud²³⁰ shows that saltatory spasm is merely an incident in the hysterical condition. The various reported cases are analyzed and the connection with hysteria pointed out.

Hysterical Trembling in Children.—Perret²¹¹ reports a case of hysteria in a girl of 11 years in whom, in addition to the ordinary symptoms of hysteria, there was trembling of both superior and inferior extremities. When any exertion was made the trembling was increased in intensity.

Sollier¹⁵² reports a case of hysterical convulsions beginning in the fifth year. There are two or three attacks each day, and other evidences of the hysterical diathesis. M. F. Price⁴⁴ also reports a case of hysterical convulsions in a girl of 13. The first manifestations of the hysterical condition occurred at 9 years. Menstruation began at 12. C. S. Stoddard⁴⁴ reports a case of hystero-epilepsy in a girl of 11 years.

Sollier²³ reports a case of infantile convulsive hysteria in a girl 5½ years old. Of all the cases reported only 9 occurred before the age of 6 years. The attacks were frequent—two or three occurring in the day, lasting from two to two and a half hours, and being typically hysterical, with other confirmatory symptoms. The case had been treated as one of meningitis, Pott's disease, and rheumatism. As the attacks were rendered more severe and frequent by overindulgent parents, the advice of Charcot in regard to isolation was advised, and finally adopted. On removal from her parents to a hospital the attacks ceased in two weeks, and a month later the child returned home perfectly well. The treatment is, therefore, the early diagnosis and removal from the parents.

Hoch and Osler⁷⁶⁴ report 2 cases of hysteria with paroxysmal inspiratory spasm. Pitres²⁴ gives the following methods

for the treatment of hysteria: First search for the spasmogenic zones (most frequent being the ovarian and epigastric) and make firm pressure. The attack sometimes ceases as if by magic. At other times gentle pressure upon the eyeball has the effect of throwing the patient into a "hypnotic sleep." The continuous current may also be used, one electrode being placed against the forehead and the other over the abdomen or the thighs, and reversal of the current. Strong currents. In some cases the spasms may be broken up with chloroform, ether, and other anæsthetics. Hypodermatic injections of morphine are also useful, but care is necessary to avoid causing the habit. Finally, to prevent recurrence of the convulsions, the wearing of colored glasses is recommended. The effect of the color must be tested, as different colors are necessary to produce the effect in different persons.

Hirschfelder¹⁸⁹ uses strong galvanic currents (20 to 60 millampères; electrodes, 6 by 12 centimetres) to the back and ovarian region, with almost uniformly good results. A. Zukowski⁸⁴, reports a case of oophorectomy for what he calls severe hysteria. The symptoms pointed to pelvic inflammatory trouble, and, on making an abdominal section, both ovaries were found cystic and enlarged to twice the normal size, and the left adherent. Shataloff⁵⁹ reports 2 epidemics of hysteria observed in Moscow. One of them occurred in a school for girls (aged from 10 to 13), as many as 18 out of 21 being consecutively attacked. It was started by a pupil suffering from paroxysms of malarial fever, which were watched by her colleagues. The nervous manifestations in all consisted in general tremor and clonic convulsions of limbs and body. The disease persisted for nearly a month, until isolation of the affected was at last enforced. The other case was observed in a lace-factory where a number of young girls, aged from 19 to 26, were engaged. One of the girls, when at work, was suddenly seized with giddiness, vomiting, and convulsive fits (of an obscure causation), after which 20 girls, one by one, developed a typical train of hystero-epileptic phenomena. Toxic influences were excluded.

Schlöss⁶⁸,²⁷⁸ relates two interesting instances of the communication of psychoses. In the first, a young woman who had shown symptoms of depression after the birth of an illegitimate child, principally in unfounded apprehensions in regard to her health, was much alarmed by an unfavorable opinion given by a physician

whom she consulted, and immediately passed into a state of violent excitement, imagining that she was at the point of death, and that she had been bewitched. In a short time she communicated her delusions and excitement to the other members of the family, consisting of her father, brother, and two sisters. They began a variety of superstitious and fantastic practices as a defense against witchcraft; neglected their work, barricaded themselves in the house, took no food, and made a violent resistance to the attempts of neighbors to enter. They were finally overpowered, and all brought at the same time to the asylum at Ybbs, Lower Austria. All recovered in less than two months, the patient first attacked being the last to recover. One of the sisters had a relapse at home, from which she recovered there.

In the other case, a young woman, daughter of an intemperate father and sister of an epileptic, herself of a neurotic constitution and extraordinarily intolerant of alcohol, became insane through remorse on account of a lapse from chastity. She bitterly reproached a female friend, who had connived at the matter, with being the cause of her misfortune, and became so excited and violent that she was discharged by her employer, and returned to her mother. She at once persuaded her mother that she was entitled to have her lodgings kept in better repair by her landlord. As he did not satisfy them, they removed several times, never contented, and were finally found in greatest destitution and filth, in a shed which afforded little protection against the weather. They manifested violent excitement, and accused a man who had offered them shelter and food of trying to poison them.

After they were brought to the asylum the mother seemed to be entirely under the influence of her daughter, who was tenderly devoted to her. They were finally separated because the mother was refusing food at the daughter's instigation. After the separation the mother became quiet and contented, but without appreciation of her morbid condition. The daughter was inactive, unsociable, ate nothing but bread and liquid food, and often abstained from eating for days together.

The author is disposed to attribute such cases to the natural tendency of mankind to imitation, and more especially to strong sympathy between the persons affected, working on minds originally predisposed to insanity.

HYPNOTISM.

During the year the contributions upon hypnotism, or "hypnotic suggestion," have been numerous. The work of Albert Moll²¹⁰⁰ has passed to a second edition, and is issued in an excellent English translation. But, from a medical point of view, the contribution of Wetterstrand²¹⁰⁰ deserves especial attention. The author is a Swedish general practitioner, and has employed hypnotism in a large number of the most varied affections. The number of cases treated was 128. The following summary shows the results obtained: Insomnia was cured in 34 out of 42 cases; nervous headache was treated successfully a large number of times, 12 cases are related fully; 13 cases of neuralgia of the most diverse origin yielded to hypnotic suggestion; 18 cases of epilepsy were treated, of which 3 were apparently cured; 16 cases of chorea were treated successfully. Of 48 stammerers, 15 were cured, 19 improved, and 13 not improved. Neurasthenic patients are difficult to hypnotize, but of 37 cases 14 were cured, 10 improved, and 13 not improved; 9 of the latter could not be hypnotized. One case of sexual perversion was cured, also a case of kleptomania. Six other cases of mental derangement of the milder grades—as melancholia and nostalgia—were treated with success. Hysterical symptoms often yield to suggestion, but cases of pronounced hysteria ("grande hystérie") are difficult to bring under the hypnotic influence, and in the author's experience only 3 out of 8 yielded to the treatment. Chronic inebriety offers a most fruitful field for hypnotic suggestion. He relates 6 cases permanently cured. In a large proportion of cases the reformation is only temporary, but the author believes that much good could be accomplished by occasional preventive suggestion. [How many of the asserted "cures" by the "Keeley method" depend upon the suggestion practiced?] Eleven cases of morphinomania out of 14 yielded to hypnotism; 3 cases of nicotinism were cured. A large number of cases where single symptoms—such as pains of all sorts, diarrhoea, spasms, constipation—were present were promptly relieved. Nocturnal incontinence of urine in children yielded readily to suggestion. Many other instances are related to show the beneficial therapeutic effects of this agent.

Ringier³⁰⁰³ treated 210 cases of various diseases, with 88 cured and 103 improved. Of these, 36 afterward relapsed. Osgood⁹⁰

gives a very favorable review of the applications of hypnotism after extensive personal experience. On the other hand, Williams⁹⁹, and many other opponents of the practice cannot claim to have much personal knowledge of the method. On the whole, it may be said that the verdict of those who have fairly tried hypnotic suggestion as a therapeutic agent are convinced of its usefulness. The reports of unfavorable results do not seem to be sufficiently established to command confidence.

INSOMNIA.

Beard,¹⁰⁶ in discussing the causes and cure of insomnia, reaches the following conclusions: 1. Sleep appears to be the result of the fall of temperature which is incident to the decline of destructive metabolism in the nerve-centres. 2. Insomnia is the result of a maintenance of pseudo-active metabolism and of consequent temperature in these nerve-cells. 3. Hyperæmia, arterial anæmia, venous congestion, toxæmia, reflexes of remote origin, or organic lesions, may each, in their turn, be factors in the maintenance of an abnormal metabolism, of an instability in the nerve-cells, and of a consequently maintained temperature which leads to insomnia. 4. Those remedial measures which directly diminish metabolism, and thus reduce cerebral temperature, best afford immediate relief from insomnia. 5. Those agents which indirectly produce this result, through their influence upon the vascular mechanism, are of secondary value. 6. Those measures which permanently improve nutrition, stimulate waste removal, and restore the normal ebb and flow of metabolic activity, and thus the normal rise and fall of temperature in the nerve-cells, such as electricity, massage, etc., have the largest field of usefulness in the cure of the insomniac condition.

Ranney¹ reports 5 cases of insomnia, with other nervous symptoms, apparently depending upon persistent eye-strain, and relieved by the measures which were adopted for the visual disturbance. There is an insomnia of gastro-intestinal origin.⁹⁹ Food of proper quality, taken at the proper time and in appropriate quantity, must be considered in connection with the therapeutic treatment. Here pepsin, alkalies, or acids, as indicated by the condition of the gastric secretions, will be useful. At times laxatives or a mercurial alterative are indicated.

Surzycki ⁵⁹ summarizes his experience in the treatment of insomnia with the newer hypnotic drugs in the following conclusions: 1. Sulphonal—which was used in 16 patients, and that usually in the dose of 1 to 2 grammes (15 $\frac{1}{2}$ to 31 grains)—acts most successfully in cases of ordinary or simple nervous insomnia accompanying neurasthenia, hysteria, and other chronic nerve affections. 2. In cases of insomnia associated with general excitement or delirium, amylyne hydrate should be preferred, which never causes any unpleasant concomitant or consecutive effects, even when administered in large doses,—from 4 to 8 grammes (1 to 2 drachms). 3. In cases of sleeplessness depending upon pain, however, both sulphonal and amylyne hydrate prove effective very rarely. 4. Urethan, given in 1- or 2- gramme (15 $\frac{1}{2}$ to 31 grains) doses, is by far inferior to the preceding two hypnotics. In many cases it fails altogether. In the remaining it induces a light and easily-interrupted sleep, the patient experiencing a sensation of weight in his head after waking. 5. Hypnon, in from 0.1- to 0.5- gramme (1 $\frac{1}{2}$ to 7 $\frac{1}{2}$ grains) doses, gives still less satisfactory results. 6. Tannate of cannabin, in the dose of from 0.25 to 1.0 gramme ($\frac{1}{2}$ to 15 $\frac{1}{2}$ grains), does not possess any hypnotic action whatever.

THERAPEUTICS.

Trowbridge ¹⁷⁰ makes a plea for the use of mechanical restraint in insane hospitals. Possibly this is required in some cases, other than surgical, but it appears that a number of superintendents of insane hospitals manage to get along very well without it. Has Trowbridge ever tried to do without restraint? A patient whose violence is controlled by having his hands confined behind him by "a roller bandage, loosely applied," does not seem to me to require much restraint. Brosius ⁶⁸ recommends the treatment of acute insanity by keeping the patients at rest in bed. He treats both mania and melancholia in this manner. Mercklin ⁶⁸ gives the history of a case in which collapse, following prolonged abstinence in acute mania was successfully overcome by the subcutaneous infusion of 500 cubic centimetres (1 pint) of a 0.3-per-cent. salt solution, morning and afternoon. At night of the same day the patient was brighter, took nourishment, and slept soundly. On the next day she ate freely. Binswanger adds a note stating that in cases of very active mania, a warm bath, with effusion of cold water,

sometimes has such a calmative effect that patients who before refused food now take it freely. The suggestion is worth noting by asylum physicians.

Voisin⁶⁷ treats sitiophobia by first washing out the stomach through the stomach-tube, and then introduces food through the same tube. He thinks there is, in most cases of refusal of food, a catarrhal state of the stomach at the bottom of the hallucinations. Svetlin²¹⁰² also urges that, in cases of refusal of food, forced feeding through the stomach-tube should be early resorted to, in order to avert inanition and its dangers. Stewart⁹ gives sulphonal dissolved in a large quantity (6 ounces—180 grammes) boiling water, then adding enough cold water to enable the patient to swallow it. Vorster²²⁶ uses sulphonal to secure sleep and motor sedation, which was obtained in the following states: The stages of excitement in secondary delusional insanity, whether acute or chronic; of acute, periodic, and chronic mania; of senile dementia; of general paralysis, of idiocy, of epilepsy. In most cases 30 grains (0.97 gramme) per day were sufficient; in a few cases 45 and 60 grains (2.93 to 3.89 grammes) were given for a short time. The dose was usually $7\frac{1}{2}$ to 15 grains (0.48 to 0.97 gramme). Toxic effects were motor paresis, first of the legs, then of tongue and arms; and sensory,—somnolence, depression of general sensibility, and abolition of superficial reflexes. No effect on circulation or respiration was observed. In 2 cases there was a skin eruption.

Näcke²⁹⁶ found chloral amid, in doses of 15 to 45 grains (0.97 to 2.93 grammes), an effective hypnotic, as certain in its action as chloral; slower, but certainly safer. Weatherly¹⁶⁶ highly recommends hyoscine, $1\frac{1}{10}$ grain (0.00065 gramme) twice a day in cases of acute mania, irritability of the insane, the tremor of disseminated sclerosis, chronic alcoholism, paralysis agitans, and general paralysis. He calls the drug a mental alterative. In hysterical mania it is contra-indicated.

Preininger³¹⁴ and Lewald³⁵⁷ tested sulphate of duboisine in states of exaltation, and found it effective in a large proportion of cases. The maximum dose, given hypodermatically, is 2 milligrammes ($\frac{1}{8}$ grain). Smaller doses often fail, while larger doses are liable to induce symptoms of poisoning. When given by the mouth, the effect is uncertain. Most patients complain of dryness of the mouth and throat, which persists during the following day.

Marandon de Montyel¹⁵² has carefully studied the effects of chloralamid and antipyrin in insanity, reaching an unfavorable judgment upon both drugs. The hypnotic action of chloralamid is too mild to be effectual in most cases of insomnia of insanity. Antipyrin, while producing its usual analgesic effects in headache and neuralgia, had no other marked beneficial action.

Obersteiner, of Vienna, corresponding editor, gives a summary of the therapeutic observations in insanity made under his direction by Krues. Chloral is regarded as the best hypnotic. Sulphonal requires care and cannot be given continuously. Paraldehyde loses its effects after a time. Urethan is too weak in its action. Cannabis Indica is occasionally useful. The methodical use of opium is often successful in melancholia. Hyoscine is effective as a quieting remedy, but dangerous. In the convulsions of general paralysis, chloral is the best remedy. Breslauer reports 7 cases of poisoning by sulphonal, in 5 of whom death resulted. There is obstinate constipation, probably due to accumulation of insoluble sulphonal in the intestines; petechiæ and livid patches appear on the skin; the urine is characteristically brownish red. At times death is sudden, even after apparent improvement.

Schuber¹⁶⁰ and Wiltrot¹⁰⁵ have used somnal as a hypnotic in a series of cases, with good effect in a majority. The dose is from $\frac{1}{2}$ drachm to 1 drachm (1.94 to 3.89 grammes). It has no disagreeable after-effects. In cases of great excitement it usually fails.

Roubinovitch⁷³ has used sulphonal as a hypnotic with considerable success in various forms of insanity. In nearly all cases success was obtained. Doses of from 12 to 45 grains (0.78 to 2.93 grammes) usually produce sound sleep in from two to four hours after administration. Cumulative effects may be produced if large doses are given on successive days. The author advises a large dose on the first day, to be followed by one-fourth of this dose on succeeding days. It is best given, in soup or tea, with the evening meal.

DISEASES OF THE BLOOD AND SPLEEN.

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AND

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PHILADELPHIA.

BLOOD.

SEVERAL important contributions have been offered on the subject of the specific gravity of the blood. Schmalz⁹⁹ has made a long series of observations in health and disease. He objects to the method of Roy, on the ground that it is tedious and requires too much blood, and prefers a capillary tube, accurately graduated to contain 0.1 cubic centimetre ($1\frac{1}{2}$ grains), which is used as a pyknometer. From 55 experiments on his own person, he concludes that the specific gravity remains fairly constant at all hours of the day. In chlorosis, the density falls in proportion with the haemoglobin; in anaemia and debilitating conditions, the specific gravity usually is low. Lloyd Jones,¹⁷⁸ on the other hand, as well as Monckton,² uses modifications of Roy's method to determine the density of the blood. This is done by preparing a series of mixtures of glycerin and water of known specific gravity, and then blowing blood from a capillary tube, bent at a right angle at the end, in such a way that, by noting whether the drop sinks, rises, or moves horizontally, the relation of the blood and the test-liquid can be judged. By successive trials the exact density is learned. These observers are likewise of opinion that the specific gravity varies during the day. Jones finds that the density also varies largely in different parts of the body and in different people. In general, the specific gravity is lower in those of poor physique and in women. Changes in density Monckton finds to be due to changes in the plasma or the number of corpuscles.

Daland¹¹² contributes a long paper on the volumetric estimation of red and white blood-corpuscles by means of the "haemato-krit," an instrument first suggested by Blix. The corpuscular

richness is determined by causing the red and white corpuscles in diluted blood to move to one end of a small tube, which is made to revolve rapidly by means of a crank, and then reading on a scale the length of tube occupied by the corpuscles, and multiplying this by a determined factor. According to Daland's description, the accurate estimation of red corpuscles is easily and quickly accomplished, but the white corpuscles cannot be counted with any accuracy on account of their scarcity. There is too little gained by this instrument to offset the disadvantages of being required to make separate microscopical examinations to learn the appearance of the corpuscles, to count the white corpuscles, and that of adding another instrument to our paraphernalia. In his investigations Daland incidentally touches on several interesting points. He finds that a 2.5-per-cent. solution of bichromate of potash is the ideal diluting fluid: preventing coagulation and change of shape of the red corpuscles, hardening the leucocytes, and not decomposing. These are certainly advantages possessed by few, if any, other fluids. His observations of the accuracy in practical estimations of the blood are highly interesting in showing an average difference of 748,825 red corpuscles per cubic millimetre between the counts of himself and a colleague for the same diluted blood. This figure is much higher than we should have expected.

Groslik⁴¹⁰ investigated the effect of saline injections on the condition of the blood of animals in health, after section of the vagi and after curarization, and found much less hydæmia than might have been expected. The effect was more marked after section of the vagus and after curarization. Rumpf³¹⁹ finds the alkalinity of the blood to vary largely in health, being usually less marked in women and children than in men. In anæmias and cachectic conditions it is likewise lowered, in proportion to diminution of the specific gravity and the number of red corpuscles in the former. Several interesting communications have been made on the formation and physiology of the blood. Mackenzie,² in the Lettsomian lectures, deals with the question of the origin of the corpuscles. He finds, in the venules of the bone-marrow, the erythroblasts described by Bizozzero, and, like this observer, found them always to contain haemoglobin. The red corpuscles always (at least in birds) are derived from pre-existing red corpuscles within the venules and by mitosis. In the adult human the

spleen plays no part in blood formation. Braunschweig,²⁰⁶⁴ in a series of experiments, determined that the thymus gland plays no part in the regeneration of the blood, whereas Grünberg^{2065; July 4} found that there is active formation of leucocytes in the lymph-glands by mitosis, and possibly, also, of red corpuscles in cases of special need. The method of formation of the latter is not known, but probably they arise from the endothelial lining of the lymph-paths. Löwit⁷⁸⁸ investigated the question of division in white corpuscles. As a rule, this is by amitosis, sometimes by a method midway between amitosis and mitosis, or, again, by mitosis. Höhlein²⁰⁶⁶ extended the observations of Schwartz and Hoffman in regard to the action of spleen-cells on haemoglobin. He found that he could first decolorize haemoglobin by means of spleen-cells, and then re-color by fresh cells, an albumen called cyoglobin being formed in this reaction.

The effect of altitude on the condition of the blood is of great importance. Muntz³ found that the density is increased at elevations; and Viault,³¹ that at 4392 metres elevation, at Morococha, his own blood contained 7,000,000 red corpuscles per cubic millimetre. From the investigations of Wertheimer,⁸ it seems that biliary coloring matters are unchanged in the blood, since, by injecting into animals pigments which are abnormal to those animals, he could, by the spectrum, detect them in the urine, unchanged. Ranking⁹⁰ investigated "surra," a disease of horses in India, and, from appearances in the blood like those of malaria, concludes that this is a malarial disease. Zumpft⁸⁴⁴ found the dry residue of the blood to be diminished in anaemia, irrespective of its variety.

CHLOROSIS.

Etiology.—We are very little nearer a definite knowledge of the real cause and nature of this disease than in the past, as the great variance in the opinions of writers proves. Kahane²⁸³ holds that the attempts to establish a mycotic form of chlorosis have wanted proof, and that writers in general underestimate the importance of the relation of blood to blood-vessels. He believes with Virchow that the true nature of the disease is one of hypoplasia of the vessels. On the other hand, Schücking⁶⁹ is of belief that the condition of the vessels is secondary to, and dependent on, that of the blood. Schubert⁸⁴ and Scholz⁶ also assign to

hypoplasia of the blood-vessels an important part in the pathology of the disease. The view that chlorosis is an autogenetic disease, due to the absorption of poisonous substances in the intestines, has been referred to by several writers. Schücking ²⁹ investigated the relation of the disease to menstrual disorders, and found, in 700 cases, irregularity of menstruation in 652, of which 124 had been regular before; temporary amenorrhœa in 200; total amenorrhœa in 43; menorrhagia in 85, alternating with scanty menstruation in 10 cases, and in 246 of the cases menstruation was never well developed.

Limbeck ³⁰ opposes the old view, recently revived by Graeber, that the blood of chlorosis shows oligochromæmia without oligocythæmia, basing his objection on the study of 16 cases, in which there was oligocythæmia as well as diminution of hæmoglobin. In his study of 84 cases, Schücking ²⁹ found the number of corpuscles reduced little below 4,000,000 in 58, considerably below this in 26, and once as low as 2,200,000, the latter group of cases being in older persons. This oligocythæmia, he holds, is secondary to the diminution in coloring matter.

Richardson ³¹ has contributed an interesting paper on the *bruit de diable* and venous hums in chlorosis. The former occurred in 51.4 per cent. of his cases,—a proportion which is low, inasmuch as he used the hæmoglobinometer, which detects the disease in the absence of pallor and other visible signs. As to venous hums, he found, in 180 cases, none in 49.4 per cent.; on the right side only in 33.3; on the left side in 6.1, and on both sides in 11.1 per cent. Of 27 cases in which relapses occurred, 66 per cent. had venous hums,—a fact which may prove of some use in prognosis. The bruits usually disappeared when the hæmoglobin showed some increase, which Richardson looks upon as a proof that they are the result of anæmia. Barr ⁵ found, in 205 cases, 115 with cardiac bruits. Of these, 56 were audible at the base, 13 at the apex, 24 at base and apex, and 22 at base, apex, and back. The last group were always accompanied by distinct dilatation of the ventricle and strong impulse; they were the first to disappear under treatment,—a fact which shows that they are present in the more advanced cases. In 2 of the 22 cases, the murmur persisted after seven and nine months, respectively, and Barr thinks that these will remain as permanent mitral regurgita-

tions. Schubert⁸⁴, found the venous hums to disappear after bleeding cases of chlorosis, and concludes from this fact that the cause of these is a plethora, due to hypoplastic blood-vessels. Potain¹⁷, ^{Dec. 22, 30, '90}, ^{Dec. 14, '90}, regards many of the bruits supposed to be intracardiac as really due to the action of the heart against the lungs.

Fever may occur in the course of chlorosis, and is the feature of a variety of the disease first described by Mollière. Paul Chéron¹⁷, ^{Dec. 5, '90} makes three classes: cases with (1) continuous, (2) intermittent, and (3) inverted fever. The continuous form is perhaps commonest; the intermittent—of which a remarkable case, with wasting, cough, and other suspicious symptoms, occurred in the practice of Jaccoud—is least so. Hayem regards cases of pure "febrile chlorosis" as very rare, the cases usually so regarded being due to fatigue or other complications. Potain¹⁷, ^{Dec. 22, 30, '90}, saw one case, and thinks most of them are due to constipation and absorption of poisons from the bowels.

Dyspepsia in chlorosis has received no small degree of attention, especially as it interferes with treatment. Labat¹⁰⁰, ^{Dec. 30, '90}, points out that there may be a *dyspepsia medicamentosa* in addition to the *dyspepsia chlorotica*. Hayem⁸, ^{Nov. 4}, investigated 72 cases of chlorosis, and found excess of pepsin in 36, decrease in 28; excess of hydrochloric acid in 6, and normal gastric juice in 2. He remarks that, in boys and girls at the age of adolescence, there is commonly some dyspepsia from "hyperpepsia," and that the advent of chlorosis makes this prominent. Liégeois¹⁸⁴, ^{Sept. 15}, La-bat¹⁰⁰, ^{Dec. 30, '90}, Chéron¹⁷, ^{Dec. 5, '90}, and others believe the dyspepsia of chlorosis to be due, as Hayem first pointed out, to lack of hydrochloric acid.

Ketcher⁵⁸⁶, ^{No. 46, '90}, investigated the urine of chlorotics, and found the quantity discharged about normal, specific gravity decreased, as also the amount of urea, uric acid, phosphates, chlorides, and sulphates. The quantity of extractives was increased. Diminution of urea and uric acid was in about equal proportion.

Potain¹⁷, ^{Dec. 22, 30, '90}, in a clinical lecture, warns against hasty diagnosis of chlorosis from mere inspection, pointing out various deceptive features, including certain anæsthesias and analgesias, comparable to those of hysteria, but not to be confounded with such. Asthma he regards as a common symptom. The disease has been growing more infrequent, owing to the better hygienic conditions of our time.

Treatment.—Iron is the generally acknowledged remedy for this disease. The French writers especially have been busied in seeking forms of ferruginous preparations which might be active and, at the same time, acceptable to the stomach. Maistre¹⁰⁰ recommends the “peptonate of iron of Robin,” which, he says, is assimilable, dialyzable, non-irritating, and may be given in wine, lozenges, or drops. It is of especial value where the stomach is irritable. Labat,¹⁰⁰ in calling attention to the absence of hydrochloric acid as a factor in chlorotic dyspepsia, suggests the combination of this acid with iron in the treatment, and recommends two preparations. The first, “*phospho-fer*,” a chlorhydro-phosphate of iron, contains 0.10 gramme (1½ grains) of phosphate of iron in the tablespoonful; the second, “*phospho-fer-calcique*,” has 0.05 gramme (½ grain) of phosphate of iron and 0.25 gramme (3½ grains) of phosphate of calcium in the tablespoonful. Both are limpid, stable, tasteless fluids, the latter especially being useful in children.

Kahane²⁸⁸ insists on rest, together with clysters for the bowels, iron, and arsenic. Liégeois¹⁸⁴ remarks that treatment must vary, according as the case is simple or complicated with gastric, intestinal, vascular, nervous, or ovarian troubles. In dyspeptic cases he advises hydrochloric acid after each meal, and uses reduced iron, or the malate, tartrate, or citrate, if necessary. When these cause disturbances, he tries the albuminate or peptonate of iron, and, finally, in the most obstinate cases, ferruginous waters or hypodermatic administration. Hayem³ points out how the dyspeptic disorders so often met with may become a serious obstacle to active treatment, and advises that such cases be looked upon and treated as simple dyspepsias, until the stomach be brought into condition for the treatment of the chlorosis itself. Allbutt² regards the alkali in the much-used Blaud's pill as unnecessary, and, further, ascribes many failures to cure chlorosis to the insufficiency of iron given. He advises the sulphate of iron,—at first, 1 grain (0.065 gramme), three times daily, for a week; then 2 grains (0.13 gramme) for ten days; and, finally, increased to 9, 10, or 12 grains (0.58, 0.65, or 0.78 gramme) daily. The pills should be freshly made, without admixture of gum; and, in case of constipation, should contain extract of aloes. When pills cannot be taken, the saccharated carbonate may be used. Mac-

kenzie² also thinks the alkali in Blaud's pill excessive. He advises a pill containing 2 grains (0.13 grammes) of the dried sulphate of iron, 1 (0.07 grammes) of carbonate of potash, and enough glycerite of tragacanth to make the pill. Treatment must be prolonged, as the haemoglobin increases less promptly than the corpuscles, and relapses may occur.

The hypodermatic administration is advised by various writers in obstinate cases. Bongiovanni⁵⁸⁹ reports a case of very marked chlorosis in a girl of 13, who had taken iron for three months without avail, and who subsequently made a rapid and complete recovery under treatment with subcutaneous injections of iron. The preparation used was a solution of ammoniated citrate of iron, 1.20 grammes (18 $\frac{1}{2}$ grains) in distilled water and laurel-water, of each, 5 grammes (1 $\frac{1}{2}$ drachms). Injections were made with the Pravaz syringe, 0.02 gramme ($\frac{1}{7}$ grain) of the salt being first injected, and, finally, as much as 0.12 gramme (1 $\frac{1}{4}$ grains) at a time. Subcutaneous injections are painful and irritating, but those deep into the muscles, followed by vigorous massage, never caused unpleasant results. Morgagni⁴¹ records his experience with 10 cases of chlorosis treated by subdermal injections of iron. He used the pyrophosphate and citrate and the citro-ammonium pyrophosphate of iron, in 5-per-cent. solution, and in dose of 3 grammes (46 grains). The injections were made with a long needle, so that the solution might be deposited some distance from the point of puncture. Speedy cure was obtained in every case. Liégeois^{58, 112} reports 30 cases treated with the acetophosphate of copper. Two pills, each containing $\frac{1}{8}$ grain (0.011 gramme) of neutral acetate of copper, were given daily before meals, mint-water with hydrochloric acid after meals, and tincture of nux vomica in the intervals. Patients took this from one to three months without trouble, taking in all 60 to 100 pills.

The almost paradoxical treatment instituted by Dyes, viz., repeated bleedings, has been freely lauded and condemned. Scholz, of Bremen,⁵⁹ in a work on "Chlorosis," in which the blood condition is treated of as secondary to contraction of blood-vessels, regards chlorosis as, in fact, a plethora. He, therefore, reasons that depletion would answer the therapeutic indication, and records his results in 30 cases treated by hot baths and venesection. The improvement was marked in every case, and urgent symptoms disap-

peared almost at once. Schubert ⁸⁴, coincides in his views with Scholz, and, like him, found the treatment of great practical usefulness. He advises bleeding in bed, 0.5 to 1 grammie ($7\frac{1}{4}$ to $15\frac{1}{2}$ grains) of blood for every pound of weight being removed, and that the patient subsequently be kept in bed twenty-four to forty-eight hours. After venesection, sweating, care in diet, and stay at the sea-shore are useful adjuncts to the treatment. Wilhelm ⁶⁰, in opposing the views of Schücking, who regards bleeding as theoretically and practically unwise, remarks that, in 56 cases, he had found the treatment of great service, and uniformly prompt to effect improvement. Schücking, ⁶⁰, however, saw cases in which great depression was caused by the treatment, and regards success as due to diminution in uterine or ovarian congestion rather than to removal of plethora.

ANÆMIA.

The most important contributions to the literature of anæmia during the last year are the Lettsomian Lectures delivered by Stephen Mackenzie. ^{Jan. 10, 1884.} After a consideration of some of the problems of blood formation and destruction, to which reference has been made above, the lecturer proceeds to the study of the anæmias, which he would classify as (a) those due to excessive hæmolysis and (b) those due to defective hæmogenesis. He makes four degrees of anæmia, according to the corpuscular richness, but admits that this is not as scientific a classification as that of Hayem, in which the individual corpuscular richness in hæmoglobin is taken as a standard. The number of red corpuscles may, he says, be extremely reduced, and he refers to the case of a child in which the number fell to 290,000 shortly before death. Decreased amount of hæmoglobin, while more or less characteristic of chlorosis, is likewise met with in some cases of cancer and purpura. The hæmorrhages of anæmia are due to the degree and not the kind of anæmia. When the number of red corpuscles falls below 50 per cent. hæmorrhages are likely to occur, and he points out that this time may be roughly estimated by noting that the pink color under the finger-nail has entirely disappeared. The remedial drugs he would divide into two groups: (a) those which increase blood formation and (b) those which lessen destruction,—the anti-hæmolytics. Of the former, we have iron, potash, manganese, phosphorus, arsenic (?), hydrochloric acid (indirectly), and oxygen.

Of the latter, arsenic, quinine, mercury, phosphorus, beta-naphthol, iodoform, carbolic acid, sulpho-carbolate, and menthol. Arsenic, like some of the others, probably acts as a germicide, preventing ptomaine formation in the intestines.

Luzet¹¹⁸ outlines the causes of anaemia in early childhood and the diagnosis of the different forms. He makes two grand divisions: (a) those anaemias with megalosplenias and (b) those without. Of the former group are (1) the anaemias consequent upon infantile cholera and other infectious diarrhoeas, in which the number of red corpuscles may fall very low, especially when the child had been previously debilitated by tuberculosis, syphilis, or repeated diarrhoea; (2) syphilitic anaemia, entirely comparable to the last; and (3) cancerous anaemia, which he observed but once, —in a case of a child 2½ years old. In the first and third named there are present more or less nucleated red corpuscles, which, Luzet holds, take origin in the bone-marrow, and occur especially in infants under 5 months, and when the anaemia is great. Of the anaemias with enlarged spleen, those of (a) hereditary syphilis and (b) of rickets are of importance. In the former, acute or chronic enlargement of the spleen may occur, and nucleated corpuscles are found in moderate number. The rachitic form occurs during the period of bony absorption. These syphilitic and rachitic anaemias are, to an extent, transitional between simple and secondary anaemias on the one hand, and diseases of blood-making organs on the other.

“Anaemia spuria acutissima” is a name given by Winter-nitz^{57, 22} to a case of apparent anaemia caused by fright. In the case recited there was sudden pallor, which persisted; murmurs, and, in general, the appearances of anaemia developed. Haemoglobin was diminished. He regards the case as one of paresis of the splanchnic nerve, with hyperaemia of the abdominal vessel, and anaemia elsewhere. The lack of haemoglobin is the same as is seen in blood taken from the hand when held in air. Under such circumstances he found as much as 15 per cent. less haemoglobin than in the blood of the toe. The immediate improvement obtained from cold shower-bathing he regards as further proof of the nature of the case.

The character of the blood in various forms of anaemia following chronic diseases was the subject of some investigations of Neubert, as recounted by Dehio.²¹ In 24 cases of phthisis the

number of blood-corpuscles were found normal, with considerable reduction of haemoglobin. The examination of 5 cases of œsophageal and 4 of gastric cancer gave similar results. He speaks of two varieties of cancer: the one accompanied by little wasting and anæmia, the other very like pernicious anæmia, but differing in the great reduction of haemoglobin. There are, thus, tubercular and cancerous forms of chlorosis, but a still more marked "syphilitic chlorosis," found during the stage of secondary manifestations. Rosenheim⁸⁴ found the gastric mucous membrane hyperæsthetic in 10 cases examined. In the milder cases this led to tenderness on pressure and discomfort after eating, but in the most severe to obstinate vomiting. He considers it likely that some anatomical basis, like erosion, to which the mucous membrane is especially liable in anæmia, may form the basis of the derangement. Carefully regulated diet, including milk, broth, yolk of egg, shredded meat, etc., with silver, constituted the successful treatment. Cavallero and Riva-Rocci⁸⁵ made a study of the respiration in anæmia, and determined that, though this is more rapid in anæmia, the more active circulation causes the same amount of haemoglobin to be exposed in the lungs. In spite of this, however, the normal exchange of gases does not occur.

Treatment.—Laache's paper, to which reference was made in last year's ANNUAL, has been republished and abstracted in several journals. It will be recalled that he insists (1) on removal of the cause, if such be found; (2) on exercise of hygienic measures,—light, air, rest, and exercise; and (3) on proper medication. Of drugs, iron stands first, and is especially useful where haemoglobin is greatly reduced. Next to iron is arsenic,—useful particularly where haemoglobin is not so much reduced as the corpuscles. Kersch^{86, 87} reports 3 cases of what he terms complicated anæmias, and details his success with natural mineral-water and warm baths as methods of treatment.

PERNICIOUS ANÆMIA.

Griffith and Burr⁸⁸ have contributed an interesting paper on the pathology of this disease. In offering a classification of the various anæmias, they avoid the terms "primary" and "secondary," using "cytogenic" and "non-cytogenic," which are not, however, interchangeable with the others. As to the pathology of per-

nicious anæmia, they hold that it has never been demonstrated that there is any disturbance of blood formation. On the other hand, Quincke, Peters, Hunter, and others have claimed that the presence in the liver of abnormal deposit of iron-containing pigment constitutes proof of the existence of blood destruction. Griffith and Burr examined the organs of 3 cases of pernicious anæmia, with the object of studying such pigments. In each case, by treatment with potassium ferrocyanide, followed by hydrochloric acid, iron was found, in greater or less proportion, in the peripheral zone of the lobule of the liver. This condition was not found in any of the variety of cases examined, including leukaemia, lymphatic anæmia, Winckel's disease, etc. From their investigations they conclude: (1) that pernicious anæmia is a haemolytic, therefore non-cytogenic, disease; (2) that pernicious anæmia is a definite disease, due to the absorption of some certain poison, probably of the nature of a ptomaine, and that, while this absorption may occur in varied cases, such as atrophy of the gastric tubules or invasion of bothriocephalus, there is always the *superaddition* of a definite disease to the pre-existing one, and this is pernicious anæmia. Johnston¹³⁰ made a similar study of iron-pigment in the liver, and, likewise, found such in the peripheral part of the lobule.

Rindfleisch²⁰ examined the bone-marrow of a case of pernicious anæmia, and found it composed mainly of haematoblasts. The formation of red corpuscles he thinks due to the constricting off from the nucleus of the haematoblast of protoplasm, colored with haemoglobin; but in pernicious anæmia this process does not take place. The disease is, therefore, he thinks, due to faulty haemogenesis. Mackenzie²¹ records his observation of 2 cases of "relapsing" pernicious anæmia. Under treatment with arsenic, in both cases marked improvement was observed and the hope of cure entertained, but subsequently relapses occurred and the patients succumbed. He emphasizes the necessity of care in making a diagnosis in children, in whom tuberculosis and other wasting diseases may lead one astray. Cancer, likewise, may cause mistakes. Dehio²² studied the blood of 5 cases of invasion by bothriocephalus latus, and found in each the character of pernicious anæmia. The therapeutic indication is to remove the worm; that failing, nothing avails to cure.

LEUKÆMIA.

Little of importance has been added to our knowledge of the cause of this disease. Fermi³⁰ found a short, blunt bacillus in the spleen of a person dead of leukæmia, and failed to find it in 12 spleens of other diseases. Kelsch and Veillard are said to have proved the pathogenic properties of this bacillus in rabbits. A number of interesting cases of acute leukæmia have been reported in the last year, and from their study it seems probable that an infectious agency plays a part in the etiology of the disease. Obrastzow³⁰ relates 2 cases of this kind: The first, a boy of 17 years, suddenly developed severe epistaxis, requiring the tampon; then grew ill, had purpura, and, further, haemorrhages; enlarged glands, liver, and spleen; leucocytosis (1 to 7) and haemorrhagic diarrhoea, followed by death. The autopsy presented medullary infiltration of the lymphatic structures throughout the body, with multitudes of micrococci in the glands, and an ulcer of the soft palate covered with membrane. The second case was that of an attendant in the hospital who nursed the other case. His illness began with purpura, then haemorrhages, and death in fourteen days after the first symptoms. Leucocytosis was marked (1 to 9), fever high, and the urine albuminous, as was also the case in the boy. If, as seems undoubted, the second case was infected by the first, the period of incubation must be from 41 to 56 days. Kast³⁰ also reports an instance of acute leukæmia, in a girl of 14 years, terminating fatally after six weeks' illness. There was fever and great prostration. Kast remarks that anatomical lesions may antedate the changes in the blood by a considerable time. The study of the blood itself has received close attention, and there is a general tendency to regard the color-tests of Ehrlich as of great importance. Thayer⁷⁶⁴ examined the blood of 2 cases reported by Toulmin, and points out that, at a period of temporary improvement in one of the cases, an ordinary examination of the blood would have failed to discover any leukæmia, whereas, by Ehrlich's methods, the "appreciable percentage of typical myelocytes" found would at once arouse suspicion, even in the absence of leucocytosis. The increased number of eosinophilic corpuscles and the appearance and proportion of myelocytes—at one time 23.5 per cent. of the leucocytes present—were features in the later history of the case. Müller³⁴ examined the blood of leukæmia

according to Ehrlich's methods, and to determine the presence or absence of mitosis. For the latter purpose, the preparations were fixed with picric acid and stained with carmine. Both cells containing and not containing haemoglobin showed mitosis, and, among others, a large leucocyte, with large, plump nucleus, was particularly noted. In the bone-marrow he finds ordinary leucocytes, marrow-cells, and giant-cells. The last occur also in the liver and, less frequently, the spleen. The fact that they are never seen in the blood shows that they are of local origin. In the capillaries of the liver cells presenting mitosis were numerous, and Müller thinks the liver a *reserve* organ for the formation of red blood-corpuses.

The presence in the blood of leukæmia, after death, of Charcot-Leyden crystals is a common observation, but during the year they have been discovered, also, in blood removed from the living patient. Ord and Copeman⁶ reported finding such crystals in the blood of a leukæmic both before and after death, though especially after death. Westphal³²⁶ found the same in fluid drawn from the spleen during life. Councilman⁷⁶⁴ reports a post-mortem study of a case of leukæmia. There was enlargement of liver, spleen, and lymph-glands. The liver showed cirrhotic changes and marked connective-tissue bands, proclaiming it of syphilitic nature; the changes in the spleen were principally due to passive congestion. A. Fränkel⁴ presented to the Verein für Innere Medicin organs from a case of leukæmia, and pointed out that there is present, in various organs, a lymphoid infiltration. In the kidneys this was of such extent that the tubules, in places, were nearly obliterated by pressure. Fürbinger thought he had seen the same appearance in Wagner's lymphomatous nephritis and in diffuse infiltrating sarcoma of the kidney.

The chemical characters of leukæmic blood have been studied by Freund and Obermayer.⁸³ The changes are such as could be explained by the excess of leucocytes and the decrease of red corpuscles. There was notable decrease of fixed substances and a notable quantity of peptones.

Jaccoud³ contributes an interesting paper on the diagnosis of leukæmia. The enlarged glands, liver, and spleen, the insidious approach of slight with abrupt onset of severe symptoms, are among the characteristic signs. The writer suggests a method of

determining enlargement of the thoracic glands. The patient is placed before the observer, the fingers thrust behind the sternum, and then the patient's head rotated. In this way the thoracic glands may occasionally be felt. Enlarged bronchial glands sometimes push the arch of the aorta up and make it palpable behind the sternum. There may be, in addition, a systolic murmur from pressure on the aorta. Enlarged tonsils and lymphoid masses on the back of the tongue may be observed, and intestinal involvement is proclaimed by intractable diarrhoea.

Luzet¹¹⁸ _{May : Sept.} ⁵¹ remarks that, in children with progressive anæmia and causeless and considerable enlargement of the spleen, in the absence of tuberculosis, syphilis, malaria, and rickets, the diagnosis lies between lymphatic anæmia, leukæmia, and Jaksch's pseudo-leukæmia of infants. The marked leucocytosis, progressive enlargement of glands, spleen, etc.; the occurrence of serious visceral lesions from emboli of leucocytes, such as retinal haemorrhages, and the fatal termination are evidences of leukæmia. Ord and Copeman⁶ _{May} report a case of leukæmia of five years' standing; Lannois,¹⁷ _{Feb.} ¹⁶ one of three years'. Ortner³⁸⁶ _{Apr.} reports the case of a child of 8½ months, which he regarded as one of leukæmia. The rarity of the disease in childhood makes the case one of extreme interest, and especially as it is the first in a female child. Ortner emphasizes the necessity of distinguishing between leukæmia and mere secondary leucocytoses. Toulmin⁷⁶¹ _{Jan., May, June} reports 2 cases of leukæmia in negroes. The one case was interesting from the malarial history, the enormous size of the spleen, and the good general preservation of strength and flesh. A further and important point was the entire disappearance of leucocytosis and the diminution in the size of the spleen under treatment with arsenic. Lannois,¹⁷ _{Feb.} in reporting a case of leukæmia complicated with ear disease, calls attention to the rarity of this complication. In 3 autopsies it was determined that exudations and haemorrhages in the middle and internal ear are the cause of these troubles. Beatty¹⁶ _{May} reports a case of more or less pure myelogenous leukæmia. The spleen weighed 10 ounces (311 grammes), but the lymph-glands were not at all enlarged. An interesting case was that of Barr's.⁶ A young man of 23 years traveled in Southern Europe, in malarial districts, and, subsequently, consulted Barr for weakness and albuminuria. The spleen and liver were found enlarged,

and there was marked leucocytosis (1 to 3). Twice, after extraction of teeth, the patient had haemorrhage, lasting seven days. Under treatment with arsenic and iron, the former in increasing doses, the liver and spleen grew smaller and the patient recovered in every respect. Mackenzie²² reports a case in which remarkable temporary relief was obtained from arsenic.

PSEUDOULEUKÆMIA.

Brentano and Tangl²³ made a case of pseudoleukæmia the basis of an investigation into the etiology of the disease. The patient, a woman, presented the characteristic appearance of pseudoleukæmia,—enlarged glands, progressive anaemia and weakness, swelling of the abdomen, and death. At autopsy there were found certain tubercular bodies in the peritoneum, two apparently recent ulcers in the intestine, and puckered apices, but no other lesion, of the lungs. On examination, tubercle bacilli were found in the ulcers and the tubercular nodules, none in the enlarged lymph-glands; but, by inoculations with parts of the glands, rapid tuberculosis was caused in animals. They conclude, therefore, that their case was one of lymph-gland tuberculosis, presenting the appearance of pseudoleukæmia, like the cases of Waetzoldt and Askanacy, though they by no means claim that this is the invariable nature of the disease. Roux and Lannois²⁴ showed, for example, that the *staphylococcus pyogenes aureus* may produce the disease. Bergtold²⁵ reports a case of pseudoleukæmia, and reviews the literature of the subject. He thinks it likely that an animal organism plays some part in the etiology, though this is by no means proved.

Tordeus²⁶ records a case of pseudoleukæmia in a child of 7 years. Enlargement of the glands preceded the symptoms of anaemia and debility by a year. He distinguishes it from scrofula by the absence of previous troubles of the skin and mucous membranes; from syphilis, by absence of history and eruption and by the greater size of the glands. There are two indications for treatment,—to reduce the size of the glands and to counteract the anaemia. Equal parts of the tinctures of iodine and galls may be painted over the glands; or a mixture of 1 part of iodine, 4 of iodide of potassium, and 60 of glycerin. For the anaemia, iron and arsenic are the best remedies. Fowler's solution may be

injected into the enlarged glands or the spleen. Baginski¹⁵⁸ reports 5 cases of pseudoleukæmia. In no case was there marked leucocytosis or the color-reactions of Ehrlich. The cases were all rachitic children, which, Baginski points out, is itself a cause of enlargement of the spleen. Nucleated red corpuscles were numerous. Loos⁸⁴ studied a number of cases of Jaksch's Pseudoleukæmia of Infants, and found splenic tumor, enlarged lymph-glands, rachitis, leucocytosis, and reduction of hæmoglobin. Nucleated red corpuscles were present in varying proportions. Death from anaæmia or intercurrent disease, like pneumonia, was the termination in most of the cases. Somma¹⁵⁸ describes three forms of lienal anaæmia: (a) with fever, (b) without fever, and (c) with recurring fever. These cases may occasionally get well. Splenectomy is of doubtful expediency, but, if done, should be done early. The disease may be micro-organismal in nature, but this is not proved. Ortner⁸⁴ records a case of transformation of pseudo-leukæmia into leukaemia, with rapidly fatal termination.

TRANSFUSION.

Thomson⁶⁹, reports 12 cases of acute anaæmia, such as those due to hæmorrhage after labor, operation, etc., treated with sterilized solutions of sodium chloride. Of the 12 cases, 8 were treated by intra-venous injections; 2 by intra-venous and intra-peritoneal, and 2 by intra-peritoneal alone. Four recovered and 8 died. He regards the intra-venous as the best method, because, when the heart is weak, solutions injected subcutaneously may not be absorbed, and because the action is more prompt. His experience would lead him to condemn intra-peritoneal injections. Injections of saline fluids prolong life, but must be followed by injections of defibrinated blood. The sugary solution of Landerer has no special merit. Holmes,¹² from studies of injections in acute anaæmia, draws the following conclusions: (1) auto-transfusion should be done first; (2) then infusion of large quantities of saline solutions; (3) immediate intra-vascular injection of salt solution should not be practiced; (4) secondary intra-peritoneal or subcutaneous injections of blood, when there is dangerous anaæmia, is a conjectural matter, but should not be practiced until reaction occurs; (5) immediate subcutaneous injections of blood is problematical, and (6) the rotary surgical pump is the best apparatus. Marshall⁸³, experi-

mented with rabbits, to study the effect of injections of mixtures of defibrinated blood and sodium chloride, and found, after a week, restoration of the number of corpuscles, and, after three weeks, of the haemoglobin. Stähle ⁶⁹ obtained good results from Landerer's sugar solution, as did Weber ⁶¹⁵ and Frank ⁸⁴ with simple salt solution. Weldon ¹⁶ thinks that blood-transfusion has fallen into undeserved neglect, because dissimilar bloods were employed, and, therefore, untoward results obtained. Castellino ⁸ speaks favorably of injections of 14 to 16 fluidounces (420 to 480 grammes) of a $\frac{1}{4}$ -per-cent. solution of soda. Lépine ³ advocates the introduction of goat's serum directly into the veins. He uses about 50 cubic centimetres ($1\frac{1}{4}$ ounces), and has found no evil consequences, though such might be feared theoretically. He suggests that possibly introduction of the serum of non-tubercular animals may prove useful in treatment of tuberculosis.

THE SPLEEN.

Martinotti and Barbacci ⁴⁹⁷ studied the function of the spleen in infectious diseases by injecting anthrax bacilli into guinea-pigs and rabbits, in some of which the spleen had previously been extirpated. The result was the same under both conditions. There were no marked elevations of temperature, but a progressive fall preceded death. This depended on the appearance of bacilli in the blood and the consequent destruction of red corpuscles. Changes in the spleen of the infected animals were mainly marked about the Malpighian bodies, and consisted in a granular condition of the cells and the appearance of a viscid substance and of pigment-matter between them. Wicklein ²⁰ investigated the pigment of the spleen, especially that containing iron. He found this in two conditions: either as granules in the pulp or trabeculæ, or as a diffuse, invisible iron-combination, which caused a uniform blue color in the sections stained for iron. This, he assumes, is pigment either beginning to be deposited or undergoing absorption. Experimentally, he found that congestion would not cause increased pigment in the organ, but that haemorrhages promptly brought this about. Bruhl ³⁰⁰ reports a case of a disease which Debove called "primary splenomegaly." These are cases of enlargement of the spleen, with anaemia, but not leucocytosis or enlargement of the glands. It terminates fatally in from six months to a year, and

may be complicated by perisplenic abscess and perforation into the intestines, and by pneumonia. Of 4 cases in which splenectomy was done 3 recovered. Tillier ²¹ records an interesting case of acute enlargement of the spleen of a malarial patient. There were, in addition, weakness, pericarditis, and great œdema, and death soon followed. Tillier believed this to be a case of Debove's splenomegaly. A similar case was reported by Booker. ⁷⁶⁴ _{Dec. 1900} The patient, a boy of 9½ years, had malarial fever two and a half months before. No enlargement of the spleen was noted before the chills, but two months after the spleen was already very large. Under quinine and arsenic considerable diminution in size was obtained. Filetti ¹⁴⁷ reports 2 cases in which acupuncture caused prompt reduction in enlarged spleens. A disinfected steel needle is thrust well into the organ. Fazio ¹⁴⁷ obtained good results from injections of quinine into the spleen for the same purpose.

Joseph Levi, ⁶⁷³ _{July} corresponding editor, Colon, S. A., reports 2 cases of abscess of the spleen,—both negroes, hard drinkers, and living exposed lives. Quiroga y Mena ⁶ _{Aug. 18} also observed an interesting case of abscess of the spleen. A boy aged 16 years, who had malaria and enlarged spleen, fell, striking his left side, and was brought to hospital with signs of left basal pneumonia and a fluctuating tumor below. The same day he vomited pus and passed some from the bowel. This condition continued for twelve weeks, when he began to improve, and in eighteen weeks was discharged well. Porge ¹⁸⁸ _{Jan. 11} reports a purulent cyst of the spleen, in the contents of which were found small, deformed, red corpuscles and cholesterol. Councilman ⁷⁶⁴ _{Jan.} presented to the Johns Hopkins Hospital Medical Society a case of perisplenic abscess, presumably the result of a fall and "internal injuries." There was subsequent rupture into the intestines and multiple hepatic abscesses.

SCURVY, PURPURA, AND HÆMOPHILIA.

W. Koch ³⁸⁶ _{1888, 1891} repeats his well-known view that all the hæmorrhagic diseases are but alterations of one form, viz., scurvy. He holds that the bacterian theory has never been proved, and regards the disease rather as the result of certain tissue changes. Milk, alcoholic drinks, tincture of iodine, and avoidance of food rich in potassium constitute his treatment. Ambrose Charpentier ⁶ ₁₈₉₈ objects to the view that milk is antiscorbutic, and reports 2 cases of scurvy

in children, in 1 of which the diet had been condensed milk. Suckling ²² reports a case of scurvy, with purpuric spots on the legs and swollen ankles and knees. The red corpuscles numbered but 1,290,000 per cubic millimetre. Retinal haemorrhages were present. Speyr ²¹⁴ records a fatal case of scurvy, and remarks that this seems to be an unusual termination.

The nervous element in the causation of purpura is as interesting as its results have been mysterious and startling. To this class of cases belongs, undoubtedly, a case reported by Anderson. ¹⁹ The patient was a young woman whom the doctor had treated for several years, during which she had suffered epistaxis, menorrhagia, metrorrhagia, haemorrhagic diarrhoea, etc., always accompanied by great mental strain, fits of crying, fright, anger, and the like; at times, death seemed imminent. Another case of the same nature is that of Yahoubian. ²³² In this instance, a girl of 16 years, in good general health and with no marked history of hysteria, began to bleed from the pulp of her fingers. This occurred without provocation and without rupture of the skin, and was not attended by any further symptoms, excepting despondency, almost amounting to melancholia. A third case, in which the nervous element seemed marked, was one detailed by Isabel Lowry. ¹⁴⁷ A young woman, whose child also had purpura, suffered with enterorrhagia, purpuric eruptions, and uterine haemorrhages. She had, in addition, lain in a "trance" for some time, had had paraplegia after labor, and again on slight provocations later; had paraesthesia and irritable feelings during haemorrhagic attacks, all of which pointed strongly to a nervous element in the purpura. Besides this case in which mother and child had purpuric manifestations, Vanderveer ⁵¹ reports some cases of haemorrhagic disease illustrating heredity. A man who suffered with haematuria several times had two daughters and a son, of whom the son only showed any tendency to bleed, and that very slight. The first daughter had seven children, of which a son and two daughters were entirely free; one son died of haemorrhage from the tongue; another of haemorrhage from the gums after lancing of a tooth; a third was a bleeder, but died of meningitis; while the last daughter suffered with occasional swelling of the joints, but was otherwise unaffected. The second daughter had four children, the first of which died in infancy, but not of haemorrhage. The other three died of haemor-

rhage. The son, himself slightly affected, lost no children by haemorrhage.

Hayem³ reports a case of haemorrhagic diathesis in a young woman with menorrhagia. The spots came out after the onset of menstruation. Such cases as this—and he has seen 2 others—Hayem regards as post-haemorrhagic haemophilia. The blood does not clot firmly, and the white corpuscles are decreased in number.

Jardine² reports the death of a child, on the twentieth day, from haemorrhage from the umbilicus. The mother was not a bleeder, but the father and a sister bled freely at the nose.

DISEASES OF THE UTERUS, PERITONEUM, AND PELVIC CONNECTIVE TISSUE; DISORDERS OF MENSTRUATION.

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PELVIC DISEASE.

General Considerations.—At the present time writers are all urging the necessity of the use of great care in the employment of the minor gynæcological instruments, both for diagnostic and therapeutic purposes. Noble,¹⁹ Baldy,⁶¹ Watkins,⁶⁴⁷ and Ferguson⁵⁶ all speak of the possible dangers resulting from the use of the uterine sound, and claim it to be a useless instrument in most cases. Playfair⁶ calls attention to the neurotic element which so often arises in connection with pelvic disease. He strongly recommends the Weir Mitchell plan of treatment in these cases.

Murray¹¹ emphasizes the association of rectal and pelvic disease. The vascular supply of the uterus, ovaries, and tubes is indirectly connected with the lower third of the rectum, the veins on the left side emptying into the left renal vein. The varicose condition of these veins is often the cause of ovarian hyperæmia and acute oöphoritis. Constipation particularly favors these conditions. When retrodisplacements exist pressure is brought to bear upon the rectum, this causing an inflammation and resulting constipation. As a result of this chronic constipation, we often have a pouching of the lower third of the rectum. This gives rise to pains in the back, discomfort on standing, a sense of dragging and fullness. This may cause a fissure at the entrance to the vagina, which can only be cured by relieving the constipation. Hæmorrhoids and anal fissures are frequently associated with uterine disease. In order to cure these hæmorrhoids, the uterus

must be replaced, patients kept in bed, and vaginal douches employed.

MENSTRUATION.

Automatic Menstrual Ganglia.—Robinson¹ has investigated the relation of the tubes, uterus, and ovaries in menstruation. He examined about 250 ovaries, tubes, and uteri of sows. The most frequent disease of their ovaries was found to be a cystic condition of the Graafian follicles. The normal ova he observed would mature and rupture by a periodic rhythm. The tubes show a state of rhythm even more plainly, and they are almost always congested. They have an intermenstrual periodic peristaltic motion. The activity of this motion is greatest during menstruation. Menstruation, he says, might be called the *motion of the tubes*. The muscular part of the fimbria which is attached to the ovary induces some tubal motion by its periodic contraction and relaxation. His theory is, that menstruation is governed by the ganglia situated in the uterine walls and along the tubes, and closely connected with the ovaries. The tubal motion constituting the cycle of the menstrual period is due to ganglia. The uterine ganglia are found in the muscularis mucosæ, and cause the uterus and tubes to perform rhythmical action. He found that the uterus is composed of adenoid tissue, and is therefore a gland. This endometric gland is only functionally active at a definite period of life. The greatest amount of movement and congestion takes place in the fimbriated extremity of the tube. The tubes execute vast cycles of congestion, motion, and decongestion. The irritation of the ganglia governing this tubal cycle induces the fimbria to approach the ovary and to secure, if possible, the egg. The ganglia in the uterus and tubes induce a cycle generally once a month. Therefore, menstruation is governed in its rhythmic cycle by the automatic uterine and tubal ganglia.

Ovulation and Menstruation.—West¹⁰⁰² gives a careful *résumé* of the literature of the subject, and from these and his own observations he comes to the following conclusions: (1) that the increased familiarity with the pelvic organs, the result of modern surgery, has not materially added to our knowledge of their functions; (2) that though the ovular theory of menstruation has not been overthrown, yet the weight of accumulating evidence seems against it; (3) that the most recent observations point to a com-

mon nervous origin for both ovulation and menstruation, and yet an individual independence.

Early Menstruation.—Lutaud ¹⁹⁴_{Dec. 11, '90} reports the case of a well-formed, healthy girl, who began to menstruate at 7 years and 2 months. The menstrual flow was accompanied each time with lumbar pains and a general feeling of fatigue.

Amenorrhœa.—Davenport ⁹⁹_{Apr. 16} divided amenorrhœa into congenital and acquired. The congenital variety is due to faulty development, such as atresia, or to anæmia. The best remedies for this variety are iron in some form, permanganate of potash, binoxide of manganese, and, above all, electricity, faradism seeming to give better results than galvanism. The acquired variety may be due to shock following childbirth, superinvolution of the uterus, change of climate, obesity, fevers, chronic diseases, etc. The treatment is much the same as in the congenital form. For the treatment of amenorrhœa, Strong ⁹⁹_{Apr. 19} recommends galvanism, and reports 4 cases successfully treated by this means. Hill ⁸¹_{Apr.} advises the use of apio-line, giving capsules containing 3 grains (0.19 gramme) each, three times a day for a week preceding the expected time of menstruation. Gattorno ³⁵⁷_{June}, recommends massage (Thure-Brandt). He employed it in 14 cases of amenorrhœa, and in all but 2 he obtained most excellent results. He finds it especially indicated in small atrophied uteri, and, according to his observations, the massage appears to increase the size of the uterus. Ward ¹⁸⁶_{Aug.} speaks highly of the use of sanguinaria Canadensis as an emmenagogue. He begins its use about two weeks before the expected menses, and gives 1 drachm (3.75 grammes) of the tincture three times a day and $\frac{1}{2}$ ounce (15 grammes) before retiring. He combines its use with strict hygienic treatment. He found the effects of the drug to be slight nausea and pains in the loins. Jones ⁶¹_{May}, commends the employment of indigo, using a mixture of indigo, 2 ounces (62 grammes); bismuth, $\frac{1}{2}$ ounce (15 grammes). Of this mixture he gives $\frac{1}{2}$ drachm (1.94 grammes) in one-third of a glass of water, three times a day. He reports 13 cases thus treated. All were cured except one.

Menorrhagia and Metrorrhagia.—Terrillon ²⁴_{Dec. 23, '90} states that the loss of a large quantity of blood from the uterus is generally indicative of lesions of the genitals and may often threaten life. He distinguishes four principal types: One where the menstrual

flow is abundant and prolonged; another where it keeps up almost continuously, ceasing only at irregular intervals; another where the flow comes on at long intervals, but at these times is very profuse; and lastly, the form in which these types may be more or less combined. The haemorrhage may be followed by the expulsion of clots, these having been the cause of severe uterine colic. Anæmia is a very marked symptom in these cases, and may be present in varying degrees of pallor. Other symptoms are loss of appetite, constipation, and general feebleness. Death rarely occurs as a direct result of these haemorrhages (post-partum is an exception). These symptoms demand a most careful examination of the pelvic organs. On examination, we may find a salpingitis, especially of gonorrhœal origin, which may be the cause of a persistent haemorrhage, which will only cease when the ovaries atrophy. Haemorrhages often occur after operations upon the breast. Generally speaking, we may expect a haemorrhage from the uterus whenever that organ is subjected to any great amount of irritation, or whenever it undergoes any pathological enlargement. In interstitial myomata our first symptom is menorrhagia or metrorrhagia; the same is true in cases of sarcoma and epithelioma. The diagnosis of the cause of the haemorrhage may at times be very difficult. Before the age of 30 it is usually abortions, salpingitis, or metritis; rarely, myoma or epithelioma. Between 30 and 45 the causes are myoma, epithelioma, sarcoma, polypi, metritis, abortions, and salpingitis. When myoma or salpingitis exists the blood is clear and unmixed. When epithelioma is present the blood is often mixed with pus, and in the intervals there is usually a fetid discharge. After the menopause haemorrhage usually indicates carcinoma or sarcoma. The treatment includes intra-vaginal, extra-vaginal, and direct uterine applications. The most common and most satisfactory plan of treatment is intra-uterine injection of hot water. If this does not control the haemorrhage then tampons of aseptic absorbent cotton or iodoform gauze should be employed. Externally, ice should be applied to the abdomen or vulva, sinapisms and ligatures to the extremities; internally, opiates or ergot.

Jorissenne²⁸² disfavors the use of drinking freely of water in cases of flooding. The great thirst which is usually present may be quenched by giving slices of sugared lemon or acidulated drops. He advises to keep the patient in a recumbent position with arms

raised, and to give her inhalations of ammonia. Mayo⁷⁷ treats cases of menorrhagia by the employment of moist vaginal tampons. He condemns the intra-uterine tampon. Duke⁶⁷³ recommends plugging the cervix with cotton. The size of the canal is first determined, then a suitable plug of cotton is made, dipped into antiseptic solution, placed upon a specially designed repositor, and introduced into the cervix and the repositor withdrawn. He considers this plan much better and safer than the employment of tents.

By secondary uterine hæmorrhage Czempin⁸⁴ _{Aug. 1} understands those hæmorrhages which do not come from the uterine mucous membrane; so that menstrual bleeding is also included under this heading. The diseases which cause it are tumors of the ovaries, tubes, and parametrium. It may also occur in acute infectious diseases. Of 500 cases of female affections, Czempin observed 22 cases of secondary uterine hæmorrhage; so that the disease is not so very infrequent. He advises not to curette the uterus, but to tampon the vagina with iodoform gauze; enjoins rest in bed, ice-bag, and fluid extract of hydrastis Canadensis.

According to Coe,⁵⁹ _{Juv. 25} uterine hæmorrhage of obscure origin is usually due to hypertrophy of the endometrium. If no contraindications are present, he divulses and curettes thoroughly, and then employs intra-uterine tampon of iodoform gauze. Electricity often accomplishes a great deal. In some cases it becomes necessary to perform a laparotomy in order to find the seat of the hæmorrhage and control it. Sellman⁶¹ _{July 11} believes that vaginal tampons for hæmostatic purposes are seldom required. They often produce serious inflammatory conditions of the adnexa, peritoneum, and cellular tissue. He finds the cause of the hæmorrhage, removes it, and the hæmorrhage ceases. He only advises the use of the tampon after making applications to the endometrium to prevent the fluid from flowing down and excoriating the external genitals; also, in prolapse of the uterus or vaginal walls where no catarrhal condition is present, and in cases of hyperplasia uteri with little secretion from the endometrium.

Anderson¹⁹ _{Mar. 25} reports a case of metrorrhagia and purpura hæmorrhagica, in a woman 24 years of age, which resisted all forms of treatment.

Dysmenorrhœa.—Champneys,² _{Oct. 21} in his Harveian lecture, states

that even to-day we do not understand the theory of menstruation. The pin-hole os or marked flexions do not necessarily cause dysmenorrhœa. He calls the obstructive variety spasmodic, believing it to be an affection of the immature uterus, and essentially a neurosis. As regards treatment, he discards pessaries, stems, and incisions of the cervix, and recommends guaiacum and sulphur, ergot and castoreum. As a last resort, he recommends dilatation at one sitting. Mulheron¹⁰⁰² urges the necessity of keeping patients in bed during an attack of dysmenorrhœa. For the pains he gives a hypodermatic injection of morphia; in the congestive form, hot baths and douches. The curative treatment should be attempted during the intermenstrual period. If displacement exists, this must be corrected. For stenosis he prefers Goodell's dilator, using slow divulsion, but never employs it unless the uterus is freely movable. For the neuralgic form fluid extract of viburnum prunifolium, 1 drachm (3.75 grammes), three times a day, a week before the expected attack; or apiol, 3 to 5 minims (0.18 to 0.30 gramme); for the congestive variety large doses of bromide and black haw.

Mechanical treatment of dysmenorrhœa has been employed by Vierordt,³⁷³ and his results, particularly in young girls with anteflexions, have been very satisfactory. If there is an inflammation present he begins with bimanual massage; then methodic flexions of the knees are made, next squatting movements twice a day, twenty at a time. This is followed by passive movements with the lower extremities, the patient on her back; finally, energetic percussion of dorsal and lumbar regions is made, the patient being bent at a right angle leaning over a chair.

ENDOMETRITIS.

Endometritis During the Course of Acute Infectious Diseases.—Massen¹⁵⁴ has investigated 18 cases of infectious diseases, with special reference to the condition of the endometrium. The cases were 3 pneumonia, 11 recurrent typhus, 2 typhoid, 1 dysentery, 1 peritonitis; cause unknown. The investigations showed that the blood-vessels of the endometrium were intensely congested, particularly the small veins and the capillaries. They showed the presence of ecchymoses, either in patches or disseminated all over the surface of the mucous membrane. The glandular epithelium was swollen, the cells were desquamated, and the lumina of the

glands filled with cells, mucus, and blood-corpuscles. The glands frequently penetrated very deeply into the muscular layer, this being a characteristic sign of endometritis, as has been demonstrated by Cornil. In most of the cases the stroma of the mucous membrane showed a diffuse granular infiltration. Consequently, a hæmorrhagic endometritis was found to be present in all of these cases, this agreeing with the observations of Slaviansky in cases of cholera.

Intra-uterine Therapeutics.—Much difference of opinion exists among different authorities as to the means of treating endometritis. Skutsch⁵⁷, divides the affection into two varieties,—hæmorrhagic and catarrhal. His treatment of the hæmorrhagic form is curetting and cauterization. For the catarrhal form, after dilatation, the uterus is first irrigated with a 3-per-cent. solution of soda, and then applications made with a 2½-per-cent. solution of carbolic acid, or corrosive sublimate (1 to 5000), or lysol, or acetate of aluminum. The canal must be kept dilated, and for this he prefers gauze to tents. The importance of thorough dilatation in the treatment of these cases is especially urged by Madden.⁵⁸ For this purpose he prefers the use of a rapid cervical dilator, like Hegar's, Tait's, Duke's, or one designed by himself. Next he curettes the endometrium with his scoop.

When there is a congestive hypertrophy present with subinvolution, he prefers the use of iodine in carbolized glycerin, and, following this, the introduction of a small tampon, soaked in a saturated solution of tannic acid and rectified turpentine (tanno-terebinth). This tampon is expelled in twenty-four hours. Then he introduces powdered boric acid by means of an insufflator. For the chronic corporeal endometritis, after curetting, he employs fuming nitric acid, and in all of the cases he urges the importance of constitutional treatment. Others who recommend curetting are Cain,⁶ Doléris,¹⁷ and Labadie-Lagrave.⁶ Reboul,⁸ on the other hand, believes that numerous cases can be cured by antiseptic intra-uterine tampons without the use of the curette.

Gattorno⁸ recommends, first, washing out the cavity with corrosive sublimate ($\frac{1}{1000}$), and then introducing strips of iodoform gauze. Dumontpalliers's zinc pencils (see ANNUAL for 1891) have met with considerable favor. Dörfler⁸⁴ prefers an application of chloride of zinc (50 per cent.). Several authors report

unfavorable results from the use of these pencils. Le Dentu³ is bitterly opposed to them, considering them far too caustic, even in the attenuated form; and Boursier,¹⁸⁸ reports 3 cases of atresia of the internal os following their use. Dumontpallier,³ to overcome the objections which the use of the zinc seemed to cause, has employed crayons of sulphate of copper, composed of equal parts of cupric sulphate and rye-meal, seven centimetres long and weighing 15 grains (0.97 gramme). They do not seem to have the objections that the zinc had, for they cause neither pain nor stenosis, and produce a rapid diminution and final cessation of the discharge. This treatment has been employed by Dumontpallier in 100 cases of endometritis of various forms. In some, the introduction of a single pencil sufficed; in others, two or three were necessary, the interval between each being about eight days. Cure resulted in about twenty days, on an average. In 4 rebellious cases he was compelled to resort to the use of zinc.

Jequirity has been highly recommended by Borde¹⁸² in chronic granular metritis. The strength of the solution employed is 1 per cent. Another new method is the one devised by Zabé,⁶⁷ who employs discs composed of gelatin and glycerin, which he calls pericollum. Each disc is about five centimetres long, one centimetre in diameter, and with an arc measuring seventy-five millimetres and containing 5 grammes (1½ drachms) each of gelatin and glycerin. The patient introduces one at night before retiring.

Tuberculous Endometritis.—Jouin¹⁴⁸ advises the following method of treatment: Dilate the uterine cavity two or three times with laminaria tents prepared antiseptically; that is to say, immersed, for twelve hours at least, in iodoform ether. Then, at intervals of a few days, use iodoform tampons for about fifteen treatments, which, in the primary forms, heal the local lesion and improve the general condition. Creasote preparations are prescribed for internal medication. Complete abstinence from coition is enjoined until the patient is entirely well.

DISEASES OF THE CERVIX.

Lacerations.—A reaction is taking place in regard to the necessity of performing trachelorrhaphy in cases of laceration. Many of the symptoms which were formerly attributed to these lacerations have now been shown to be due to diseases of the

adnexa. In Germany, particularly, the operation of trachelorrhaphy is seldom performed. Marcy⁶¹ treats lacerations of the cervix, vagina, and perineum by using the animal tendon for suturing. He claims priority over Werth in the use of this variety of suture by five years. Crowell¹⁰² and Ashton¹⁹ both prefer amputation to trachelorrhaphy in cases of hypertrophy, Ashton having found that in nearly all of his cases of cancer of the uterus his patients had borne children and had lacerations of the cervix; so that he considers the lacerations as an etiological factor in the production of cancer, and therefore believes that amputation should be the operation performed. He covers the stump with a flap of vaginal mucous membrane.

Cervical Stenosis.—Farley¹⁰³ states that the congenital variety of stenosis usually includes an imperfect development of ovaries, tubes, and often of the entire generative apparatus. In cases of so-called pin-hole os he incises for the distance of a quarter of an inch, making a crucial incision, and then, introducing a conical steel sound, sees whether the os internum is patulous. He then introduces a cervical plug of cotton-wool covered with iodoform and boric acid. In the acquired form the stenosis is generally at the os internum. For this variety he uses the dilator. Others in favor of the dilator are Purslow,²² who prefers Hegar's, and begins with size 11 to 13 and increases to 20; Phillips,² and Ross.¹ Phillips classifies the methods of cervical dilatation as follows: (1) gradual dilatation by sponge, laminaria, and tupelo tents; (2) Tait's continuous elastic dilatation by means of special bougies; (3) rapid dilatation by means of Hegar's bougies, Hank's or Duncan's dilators; (4) a combination of tents and dilators. He is strongly in favor of Hegar's method, and reports 31 cases in which he dilated the cervix for haemorrhages after incomplete abortions, repeated haemorrhages in non-pregnant condition, dysmenorrhœa and sterility due to stenosis, affections of the endometrium, and removal of intra-uterine tumors. In all of these cases relief was obtained, and in many a permanent cure.

UTERINE DISPLACEMENTS.

General Considerations.—Peckham¹, discusses the different variety of pessaries, particularly for anteflexion and retroflexion. For complete uterine prolapse she recommends the inflated ring-

pessary; for anteflexion, the Gehring or Thomas modification of the Albert Smith; for posterior displacements, the Thomas soft rubber; where a hyperesthesia of the *cul-de-sac* of Douglas exists, the soft-cushion pessary (Sarah E. Post).

Retroversions and Flexions.—Küstner⁸⁴ believes that when we cannot replace a retroverted or flexed uterus by the ordinary means, or where a pessary does not fulfill its object, the proper treatment is to narcotize the patient deeply, introduce one or two fingers into the rectum, the thumb in the vagina, and the other hand on the abdomen, and thus attempt reposition. If adhesions exist, these are broken up. Then, after reposition has been accomplished, a properly fitting pessary is introduced and the patient kept in bed for awhile. When this cannot be done, he recommends massage, to be kept up for a long period, till all the adhesions have given way, and then to attempt reposition or else perform a laparotomy. In doing a laparotomy he employs a forceps something like an obstetrical forceps, thin and blunt and having no pelvic curve, being just large enough to grasp and raise the uterus. As to performing ventro-fixation, that must depend upon circumstances. If the adnexa are normal, the woman young, and it is possible for her to become pregnant, a well-fitting Thomas pessary is inserted and the wound closed; or the posterior cervical wall may be sewed to the posterior vaginal wall, as high as possible, sewing on the right or left side, according to whether the rectum lies to the right or left. If, on the other hand, the woman is approaching the menopause, the uterus is fixed to the anterior abdominal wall by means of two or three silk-worm-gut ligatures (Leopold). He considers Alexander's operation uncertain, and thinks that it can only be employed in uteri which are very movable.

Cushing²² gives the position of the normal uterus as follows: When the bladder is completely empty the fundus should be in close apposition to the top of the contracted bladder, and the pressure of the intestines should be behind the uterus. The broad ligaments exert very little influence in regard to the backward or downward displacement. The condition of the perineal body and pelvic floor has much to do with the normal position of the uterus. Prominent conditions which cause posterior displacements are enlargement and endometritis. When no adhesions exist and the

abdominal walls are relaxed the uterus can readily be raised from its displaced position by pressing one hand down behind the fundus, and, with the fingers of the other hand in the vagina, pushing the cervix back. If, however, the abdominal walls are thick and there are adhesions, he places the patient in Sims's position, introduces a speculum, draws the cervix down with vulsellum-forceps, then replaces the uterus with a uterine sound or a No. 8 urethral sound. He does not believe that this method will cause a cellulitis or peritonitis. It is, however, contra-indicated in acute or subacute pelvic peritonitis, salpingitis, and ovaritis. When a salpingitis co-exists, he opens the abdomen, removes the tube, and stitches the uterus to the anterior abdominal wall by means of two silk-worm-gut ligatures. He believes that the Hodge, or some modification of it, is the only pessary to be employed. It is essential, before introducing it, to have the uterus anteverted, and for there to be no tenderness in the *cul-de-sac* of Douglas. The method formerly adopted, of treating the symptoms which are present in retroflexion first and then attempting reposition, has been reversed by Fehling. ²¹⁴ _{May 15} He replaces the organ at once, when this is possible, and finds that this usually causes a disappearance of all the other symptoms. Contra-indications for immediate reposition are recent inflammations in and around the uterus (it may be necessary to wait one or two years before we dare attempt reposition), acute catarrh, particularly gonorrhœal, catarrh of the tubes, and pyosalpinx, with adhesions. The results of careless reposition may be pelvo-peritonitis, peritonitis, and peri-uterine hæmatocœle. When the uterus cannot be replaced at once he advises iodine locally, iodine-glycerin tampons, ichthylol, hot injections, scarification of the cervix, baths, etc. When practicable, he first attempts manual reposition. Trendelenburg's position often aids materially in the reduction. If this does not prove successful, he tries it during narcosis or with a sound. With careful antisepsis he does not consider the use of the sound dangerous. After the uterus is in place, he introduces a pessary,—Hodge, Thomas, Olshausen, Schultze, etc. When this does not hold it in place, he uses Brandt's method, this requiring practice, however. Fehling's method is, briefly, as follows: The uterus is anteverted with the finger or the sound, the cervix is fixed between the first and second fingers, these fingers remaining stationary, while the other hand grasps the

posterior surface of the uterus and pushes it into a supernormal anteverted position, then making circular rubbings, beginning at the fundus and going down to the *cul-de-sac* of Douglas. The right and left broad ligaments are then alternately massaged and the uterus moved from side to side. Next, those portions of Douglas's fold which are most sensitive are massaged, and finally, massage is applied to the ligamenta vesico-uterina. A pessary is then introduced, and the patient must lie on her side for one hour. The method just described is painful at first, and can only be kept up for two or three minutes. It may, however, be gradually increased to ten minutes. Duration of the treatment extends over from one to six weeks. Patient should wear the pessary for a time. Of 20 cases thus treated 15 were cured, in the other 5 ventro-fixation had to be performed. In doing this operation he inserts three sutures, allowing them to remain ten or twelve days. He disapproves of removing ovaries, for if this is done ventro-fixation becomes an unnecessary operation. Most cases of retroversion with adhesions were found by Lapthorn Smith¹⁰⁰² to be the result of a miscarriage or a labor. The patient being on her back after labor, the heavy fundus naturally falls toward the sacrum, and is held in this position by the abdominal binder. Furthermore, the discharges accumulate in the *cul-de-sac* of Douglas, and thus adhesions are formed. He believes that after labor the patient should turn from side to side, and that the binder should be abandoned and the patient be allowed to sit up to pass urine and faeces.

From all sides we hear authorities condemning the Alexander operation,—some urging the difficulty of finding the ligament, others claiming that it merely changes one pathological condition into another; others again, that it interferes with subsequent pregnancies and favors abortions. Alexander² has taken up the subject in self-defense, and has carefully studied the effects of the operation: firstly, upon subsequent pregnancies and parturitions; and, secondly, the effects of subsequent pregnancies and parturitions upon the position of the uterus. It is generally believed that shortening the round ligament will lead to an abortion, or that, if the case should go on to term, the round ligaments will become stretched so much that the old displacement will recur. The results of his observations show that (1) the occurrence of pregnancy is favored in cases of retroversion by shortening the liga-

ments, and when pregnancy occurs it proceeds and terminates naturally; (2) in retroversions, the displacement does not tend to recur after labor, but that if it does return it is due to the amount of destruction to the perineum caused by the passage of the child's head. During pregnancy the development seems to take place more in the fundus, thus making the uterus grow away from the ligaments, and consequently no tension is put upon them. Theoretically, the fact of the small amount of strain upon the ligaments is explained by Alexander as follows: The distance from the internal ring to the site of their attachment to the uterus is probably not greater than in the pregnant and unimpregnated uterus. Any strain during pregnancy upon the shortened ligaments does not so much produce stretching of these ligaments as development of the uterine cavity in a direction that does not increase the strain, and consequently the attachment of the ligaments apparently to a part of the body of the uterus much nearer the cervix than usually occurs. Any stretching of the ligaments that may occur is probably rectified by post-partum shortening, and that both uterus and ligaments re-assume, if involution has been natural and complete, as nearly as possible the condition that existed before pregnancy took place. He then cites 7 cases in which labor occurred after the operation, and in all of these there was no effect upon the ligaments.

A modified Alexander operation has been devised by Newman,¹⁰⁹ who calls it the direct method. It is the same as the one described by Edebohls at the last International Congress, and he claims one and a half years priority over Edebohls. The results of his operation in 19 cases were as follow: In 13 the uteri remained normal, in 5 they became retroflexed, and in 1 partially retroverted.

Hysterorrhaphy.—This operation is coming more and more into popular favor, and numerous modifications of it are being constantly devised. Fraipont¹⁴⁸ gives, as indications for the operation, severe pain and functional disturbances which resist all forms of treatment; the uterus movable, but the condition of the adnexa such that a pessary cannot be borne, or where the uterus is bound down by adhesions. He does not consider that the operation possesses the danger of Schultze's method; and, moreover, it permits of the removal of the adnexa, should they be found to be diseased,

and it assures the fixation of the uterus. Others in favor of the operation are Chunn,⁶¹ who uses a single silk suture, passing through the uterus and abdominal wall; and Sperling,⁶⁹ who reports 10 cases, with excellent results, treated after Leopold's method. Of the modifications, the most important are those devised by Krug,¹ Currier,¹ Bernays,⁷⁸ and Napier.² Krug's operation is only applicable to freely movable uteri and those not complicated with diseased appendages. He places the patient in the Trendelenburg posture (pelvis elevated at an angle of at least 45 degrees), a sound is introduced into the uterus, a tenaculum steadies the cervix, and a catheter introduced into the bladder. An assistant, who holds the sound, brings the uterus forward to the anterior abdominal wall. Where the fundus is felt a very small incision is made through the linea alba, and the cut extended down to the fundus. A modified Peaslee needle is next passed through the abdominal wall about a quarter of an inch from the edge of the incision. With the cutting edge of the needle a square inch on the anterior surface of the uterus is denuded, the needle passed through the uterine wall and brought out through the abdomen at a point opposite its entrance. It is then threaded with silk-worm gut and withdrawn. Two ligatures are inserted in this way, this closing up the wound. Currier describes a case in which, upon opening the abdomen, he found enlarged cystic ovaries, one of which he removed; then raised the uterus from its retroflexed position and passed two silver sutures through the uterus, one on either side, just within the junction of the tubes to the uterus. These sutures were then united externally and the wound closed. Removed at the end of two weeks, and uterus found to be firmly adherent to anterior abdominal wall. Bernays removes one ovary,—preferably a pathological one,—and then fixes the uterus to the anterior abdominal wall by the stump left after removing the ovary. Napier does a modified hysterorrhaphy for chronic senile procidentia. He passes two ligatures through the vagina and uterus, and attaches them through the abdominal peritoneum and keeps them in place by plates of glass or bone.

The operation devised by Schücking has also been modified, especially by Sänger³⁴ and Törngren.²³⁸ Zweifel¹³ states that the accidents which may occur in the Schücking method, namely, injury to the bladder and tendency of the sutures upon the external

os and portio to cut deeply through the tissues, can be overcome as follows: Begin operation with a transverse cut in the anterior vaginal wall, using a flat Paquelin knife; draw the portio down and push the bladder up. Pass the curved needle through the uterus and vaginal tissue; thread and withdraw. To prevent cutting, a lead plate is passed under the suture and held in position by a glass pearl. The wound in the vaginal vault is closed with this suture, and the sutures removed at the end of six weeks. Sänger, in 3 cases, drew the uterus down with a bullet-forceps applied to the anterior cervical wall; then passed a needle through the portio and vaginal wall and tied. Törngren operated upon 12 cases, modifying the operation. He draws the uterus down, and then introduces his needle, armed with a thread, between the neck of the uterus and the bladder, in the anterior peritoneal *cul-de-sac*, as high up as the fundus; then he introduces a sound into the uterus and strongly anteflexes it. He next pushes the needle into the uterus until he can feel it touching the sound. The handle is then elevated toward the symphysis, and the point of the needle made to appear at the external os and the thread scized and tied. Then he proceeds as in Schücking's operation.

FIBROMATA.

General Considerations.—The changes in the endometrium, tubes, and ovaries which take place when fibroids are present have been the subject of considerable study. Schimal²³⁶, examined the condition of the endometrium in 15 cases in which hysterectomy had been performed for fibroids. His conclusions are, that in cases of fibromata which protrude into the uterine cavity the mucous membrane covering the tumor atrophies, while that portion opposite the tumor becomes hypertrophied. In the atrophied membrane the superficial epithelium is normal, the glandular tubes are irregular, and the stroma rich in nuclei. He believes that the atrophy is caused by tension due to the growth of the tumor. The hypertrophic condition he finds to be due to a morbid growth of epithelial structures. This explains the liability of such alteration in the mucous membrane to take on a malignant growth.

Popoff¹⁵¹, has studied the pathological changes in the tubes and ovaries. He examined 13 tubes taken from 7 operations for removal of the adnexa for fibromyomata of the uterus. Five

of these showed no change, 4 showed a catarrhal inflammation, 2 showed hyperæmia, 1 presented a haematosalpinx, and 1 had undergone interstitial fibroid change. In some the tubes were filled with a serous or a sero-sanguineous fluid, and their external orifice was obliterated. The changes which he found in the ovaries led him to draw the following conclusions: 1. In fibromyomata of the uterus the ovaries are almost always the subject of more or less extensive changes, including the tunica albuginea, the interstitial tissue, and the follicles. 2. Changes in the interstitial tissue are most frequently observed, being always manifested by proliferation of the connective tissue with increase in the volume of the ovary. 3. This interstitial process appears to extend uniformly along the length of the entire cortical layer, or it may involve only small portions of the organ. It may involve only vessels and nerves at the periphery, and appear as a thickening of the vascular walls with obliteration of the lumen of the vessels, together with thickening of the peritoneum and atrophy of the nerve-fibres. 4. The follicles participate in this process in two different ways,—either they present an exaggerated development, each ovary showing cystic degeneration, representing the Graafian follicles in different stages of their development, or the follicles are destroyed, having undergone an atresia which involves the primary and the Graafian follicles. 5. The same process of atresia occurs also in cases of cystic degeneration with the formation of small cysts, the result of the atresia being to cause the appearance of bodies of different dimensions (corpora albicantia), corresponding to the volume of the distended follicles. 6. This obliteration of follicles appears to be the most frequent mode of termination of affections of the ovary (follicular oöphoritis). The principal character of the corpora albicantia which result from the hyperplastic Graafian follicles is the absence of vitelline cells. In certain cases, however, accumulations of pigment are found at their periphery or their centre, resulting from haemorrhage which has preceded in the cavity of the follicle. 7. The medullary substance of some ovaries is characterized by excessive vascularity.

Treatment.—The results in cases of fibromyomata treated by electricity, by removing the ovaries and tubes, and by the old treatment, namely, ergot, rest, etc., have been carefully studied by Ross.¹ He believes that if the patient is not near the meno-

pause the ovaries and tubes should be removed. If the patient will not submit to this, the interior of the uterus should be treated with haemostatics. Under this head he includes the actual cautery and the positive electrode. In many cases galvano-puncture gives great relief. Electricity he does not believe will accomplish much. Rennie²⁵⁷ states that ergot acts well in two ways,—it checks the nutrition by diminishing the amount of blood sent to the tumor, and favors its pedunculation and expulsion. He believes it best to administer it hypodermatically. *Hydrastis Canadensis*, in from 15-minim to 4-drachm (0.90 to 3.75 grammes) doses, checks the haemorrhage, but does not affect the size of the tumor. Bromide of potash and other remedies are used with varying success. Electricity controls the haemorrhage for a time at least. It certainly lessens it. In some cases it reduces the size of the tumor, but that it causes a total disappearance is still a disputed point. Its application is not free from pain, and local erosions may be produced by a current not exceeding 120 milliampères. It is not unattended by danger to life, for puncture of the tumor and the employment of galvanism have caused death in a number of cases. We often obtain no better results from electricity than from palliative measures.

Engelman²⁵⁸ reports 409 cases treated in Kreuznach by employing mother-lye (*mutter lauge*) in baths. At least thirty baths must be taken. The temperature of the bath should be low. Compresses of diluted mother-lye are also applied to the whole lower part of the body and kept on all night. Ergotin is also employed hypodermatically daily. He recommends Bombelons. Of 304 cases treated by baths, 63 per cent. showed decided improvement, 18 per cent. were completely cured, and in 19 per cent. there was little if any change. In addition to the baths, ergotin was employed in 96 cases. Of these, 64 per cent. were improved, 18 per cent. recovered, and 18 per cent. showed no change. Electrolysis was used in 21 cases. Of these, 62 per cent. were improved, 25 per cent. cured, and in 13 per cent. there was no effect. Engelman summarizes the treatment as follows: A great many cases are relatively amenable to treatment, which must be persisted with for a long period of time, and which should consist of lye-baths alone, or in combination with ergotin or electricity. This plan only cures a certain number of cases, but gives great

relief in the majority. In serious cases, before resorting to an operation, this method should be tried, as it puts the patient in a better condition to stand the operation.

Spontaneous Cure.—Cases in which a spontaneous cure occurred are reported by Goelet,¹ Petitclerc,²⁰³ and Popoff and Stoff.²⁰⁴ In the latter's case the tumor had existed over ten years, did not calcify, nor was the spontaneous cure brought about by labor. The tumor underwent a cystic degeneration. The impulse to the inflammation seems to have been an attack of influenza.

Dilatation.—Vulliet's method of dilatation, by tampon and incision of the uterine wall, for the removal of submucous and intra-mural fibroids, is discussed by Juillard,¹⁶ who reports 10 cases treated in this manner. The tumor is forced from its bed by uterine contractions into the cavity of the uterus, from which it can be removed either entire or in pieces. It is claimed that, whenever the uterine cavity is deeper than the largest diameter of the tumor, and there is a layer of contractile tissue outside the growth, a radical cure may be expected.

Electrical Treatment.—Authors in favor of electrical treatment for the cure of fibroid are Nairne,²⁰ Hayes,⁷⁶⁰ Martin,⁷⁷⁹ Homans,²⁰⁹ Van Pect,²⁰⁹ Baker,²⁰⁹ Massey,²³ Keith,² Lyons,²¹⁴¹ Cutter,⁸¹ Zweifel,⁶⁹ Prochownik,⁶⁹ Fisher,¹⁹ K. J. Aergaard.³¹⁷ The majority of these authors expect to relieve the symptoms rather than to see entire disappearance of the tumor. The tumor becomes diminished in size, and the haemorrhage usually ceases. Tait,²² however, still continues his opposition to electrolytic treatment of myoma; he will not admit its usefulness in any case, and reports a case of soft, edematous myoma successfully removed after failure of electrical treatment. Baker²⁰⁹ employs the electro-puncture, applying both needles to the substance of the growth. The needles are of steel, covered with hard rubber to within an inch of the tip, which has a flat cutting edge and is gold-plated. The strength of the current used is 75 to 100 milliampères; length of time, fifteen minutes; number of applications, one to three.

Vaginal Hysterectomy.—Tod Gilliam¹ and Vallin²²⁰ report cases treated by this method. In the former the fibroid, which rested in Douglas's pouch, was removed through the vagina. Gilliam, however, advises against this method of operating.

Vallin's case was one of a small fibroid situated on the posterior wall of the uterus, giving rise to intense pain, which disappeared entirely after removal of the tumor.

Supra-vaginal Hysterectomy and Myomectomy.—During the past year the treatment of the stump has absorbed the attention of many operators. Kunn⁸⁴ _{July 18 to Aug. 22} describes a method practiced by Maydl. The tumor is brought outside of the abdominal cavity after the uterine arteries have been secured. The capsule is split, the tumor peeled out, and the bleeding vessels secured by forceps. The uterine cavity is then washed out and the mucous membrane excised to below the point at which it is to be subsequently tied. The cervix is elevated by drawing upon the capsule of the tumor until the cervix is above the symphysis; then a double silk ligature is passed as deeply as possible from before backward on either side of the cervical canal and tied right and left. The capsule is then sewed together, peritoneum united, and the abdominal cut sewed up. Ott⁸⁵ _{Oct. 24} recommends several modifications in treating the stump so as to shorten the time of the operation. The lower portion of the uterus is scraped out with a sharp spoon and cauterized; the abdomen is then opened and tumor removed. Four ligatures are passed through the stump, just below the cut surface, outside of the cavity of the uterus, two longitudinally and two transversely. These, when drawn together, thoroughly ligate the substance of the uterus, but leave the cavity free. Lapthorn Smith²⁵⁷ treats the stump with Koeberle's serre-nœud and Tait's pins. He prevents sloughing of the stump by not tightening the wire at first more than just sufficient to control the haemorrhage.

Milton⁸⁶ _{Nov. 29, '90} makes an incision with scissors into the anterior peritoneal covering, and then passes around an inch and one-half above the vesico-uterine fold to a corresponding point on the opposite side. The ovarian arteries in the broad ligament are tied outside of the ovaries. The uterine arteries and veins are seized by forceps outside of the reflected peritoneum, and the uterus snipped across just below the body; the mucous membrane of the cervix is cut out and the opening closed by sutures. The arteries are then tied and the flaps closed over the stump. He employs no drainage. Pichevin⁸⁷ _{Apr. 1} treats the pedicle by cauterizing it thoroughly with the thermo-cautery in such a manner as to diminish its diameter. He is particular about asepsis around the pedicle and

the deep portions of the pedicle. To be assured of this he employs salol and iodoform. From the twelfth to the twentieth day he curettes the funnel, and obtains union by second intention of the abdominal parietes, situated between the skin and the deep portions of the wound. McArdle,²² advises intra-peritoneal treatment of the stump, using the omentum to cover any insufficiency of the peritoneum covering the stump. He is opposed to the use of undue pressure during the provisional occlusion of the vessels in the stump, and the use of the cautery, astringents, etc.,—in fact, anything that will lower the vitality of the stump,—or of the use of solutions that will produce any change in the peritoneum.

Terrillon,³ Boiffin,¹²⁷ Doléris,¹⁹⁴ Mignon,⁵⁷⁷ Opie,⁶¹ Spencer Wells,² Crowell,¹ Chevrier,¹⁹⁴ and Rohé⁴³ all report successful cases treated by the abdominal method.

The removal of an exceptionally large œdematosus myoma with uterus and appendages is reported by McIntyre.¹⁰⁹ The tumor weighed 93½ pounds (2890 grammes). The woman was 38 years old; single. Circumference of the abdomen fifty inches, and from xiphoid to symphysis thirty-two inches. The incision extended up to the xiphoid. Adhesions were very numerous, especially to the liver and diaphragm. The patient died, on the third day, of septicaemia.

Fibromyomata of the Cervix.—These tumors are rare, occurring, according to Winckel, in about 5 per cent. of all myomata. Dsirne²¹ states that they generally occur upon the posterior cervical wall. All three varieties may be found. The majority, however, are submucous or interstitial. An operation may be indicated when the tumor attains a large size and where there are pressure symptoms and excessive haemorrhage. The operation to be performed is colpomyotomy.

CARCINOMA AND SARCOMA.

Carcinoma.—The most prominent symptoms of cancer of the body of the uterus are, according to Hofmeier,²² haemorrhage, some discharge, and colic-like pains. A positive diagnosis can only be made by a microscopical examination of an excised portion. He believes that mistaking it for malignant adenoma makes no difference. He has noticed that it occurs more frequently in multiparæ and women who have borne but few children.

Winter⁴ emphasizes the great importance of an early recognition of cancer in order to make the operation successful. Statistics now show a mortality of 25 per cent. five years after total extirpation of the uterus.

Two cases of cancer of the cervix in the negress are reported by Kelly.^{2150 Nov. 10} These cases are said by him to be extremely rare, as negroes do not seem disposed to have cancer.

Palliative Treatment.—In many cases, either because the disease was not recognized sufficiently early, because it has progressed too rapidly, or because the patient will not submit to an operation, palliative treatment should be attempted, and often does a great deal of good.

Potherat²³⁶ states that the patient's life may be made comfortable by counteracting the haemorrhage and the fetid discharge, which hasten the cachexia and the fatal termination. The unhealthy tissue is scraped away with a curette, and all shreds left after scraping are trimmed away with a scissors. The portion left is burnt with the thermo-cautery, and the parts dressed with iodoform gauze, which is renewed every two days, and the parts washed with an antiseptic solution. Cuellar^{100 June 18} and Reed^{61 July 11} also recommend curetting as a palliative measure.

Vaginal Hysterectomy.—During the past year a large amount of literature has been written upon this subject, and operators on all sides favor the operation, claiming better results with more perfect technique than could have been at first anticipated. Binnie's conclusions, after collecting the statistics of cases operated upon by this method, are summarized by him as follows^{72 Sept.}: 1. Vaginal hysterectomy is a comparatively safe operation. 2. In many cases vaginal hysterectomy effects an absolute cure. Where it does not do so it generally gives relief from distressing symptoms. 3. The more localized the carcinoma, the sooner should total extirpation be performed. 4. When it is surmised, but not known positively, that all the disease cannot be removed, the operation ought to be performed. 5. Adhesions in the upper portions of the uterus when there is cancer in the lower call for, at least, an exploratory laparotomy, and if these adhesions prove to be the result of inflammation hysterectomy may be performed. 6. Superficial extension of the disease over the vagina does not absolutely contra-indicate operation. 7. Clamps for the control of bleeding are probably as

safe as ligatures if antiseptic precautions are rigorously attended to; certainly, their application is infinitely easier and more rapid.

Martin²¹⁴ is also a strong advocate of this method. He states that the future will demonstrate that ligatures are preferable to clamps, and that, unless there is a special indication for drainage, the peritoneum should be as carefully closed as after an abdominal operation. The stumps of the broad ligament should be everted toward the supra-vaginal opening and drained. He believes that vaginal hysterectomy should be performed in all cases of cancer of the uterus when it is still practicable to remove the organ without materially increasing the mortality, and that it should be adopted at the earliest possible moment after the diagnosis has been made. The immediate mortality in the hands of experienced surgeons should not be over 5 per cent. Leisse²⁵ gives the statistics in 80 cases which had been operated upon over two years previously. Of these, 45, or 56.25 per cent., are living, and 35, or 43.75 per cent., died. Of the 35 deaths, 8 died of other affections.

Montgomery¹⁰⁰² has had most excellent results. Before operating, as a preliminary step, he curettes away all the diseased tissue and tampons with iodoform gauze. When operating, the patient is placed in the lithotomy position, the vagina washed with corrosive sublimate (1 to 2000), then dried with peroxide of hydrogen (1 in 4). The cervix is grasped with a vulsella and drawn down. An incision is made about the cervix, above the seat of the disease, and the vagina pushed away anteriorly, dissecting with the finger until the peritoneum is reached. The same thing is done posteriorly. The vagina is then dried and all bleeding controlled. Next, an opening is made through the *cul-de-sac* of Douglas, and a large sponge with tape attached is pushed through, so as to keep the intestines back and prevent the entrance of blood, etc. The peritoneum is then opened anteriorly and a pair of clamps applied to the left broad ligament. The clamp should be applied outside of the tube and ovary, so that the latter be removed with the uterus. Another clamp is applied to the right broad ligament and the uterus cut away. The sponge is removed and the wound packed with gauze. The operation, when performed in this manner, can be done very quickly. Montgomery has done it in fifteen minutes. The clamps are left on from twenty-four to thirty hours. The tampon is retained for forty hours, and the cavity then washed with

corrosive sublimate, carbolic acid, or peroxide of hydrogen. He concludes that the operation is justifiable where any part of the uterus is the seat of malignant disease and the disease has not passed to the surrounding tissues. He prefers the clamp to the ligatures.

Schauta, ⁵⁷ _{Dec. 14, '90} after opening Douglas's pouch, sews the peritoneum to the vaginal border of the wound with silk. Then he goes anteriorly and pushes the bladder away. Next he ligates the broad ligament, passing the needle from the anterior to the posterior portion, using silk, and passing two, three, or four ligatures on each side, and then cutting away the uterus. The entire peritoneal wound is sewed to the vaginal, thus shutting off the cavity completely. Of 70 cases thus operated upon by him 5 died (2 as a result of the operation). Amongst other authors in favor of the operation, and who report successful cases, may be mentioned Martin, ⁶¹ _{Jan. 31} Haynes, ¹⁰¹ _{Aug.} Leisse, ⁹⁰ _{Oct. 1} J. Veit, ⁶⁹ _{Oct. 1} Price, ¹⁰⁰³ _{Oct.} Ricketts, ⁸⁵⁶ _{May} Wenning ⁵³ _{Sept. 12} (in this case the patient developed diphtheria, beginning in the vagina and extending down to the vulva, dying on the thirteenth day after the operation), Goullioud, ²¹¹ _{June 7} Schwartz, ¹⁰⁰ _{Sept. 17} Robin-Masse, ²²⁰ _{Oct. 16} Terrillon, ³ _{Mar. 18} Tenomenoff, ¹⁵⁴ _{Mar. 18} McLaren, ¹⁰⁵ _{Oct. 1} Dunsmore, ¹⁰⁵ _{Oct. 1} Cushing, ⁹⁹ _{June 4} Wythe, ⁷⁷ _{Feb.} Gilliam, ¹⁰⁰² _{Aug.} Kaltenbach, ²⁴ _{Sept. 20} McNutt, ²¹⁵¹ _{Oct.} and Brewis. ⁸⁶ _{May} Evans ¹⁸² _{Nov.} enters a protest against vaginal hysterectomy for cancer; she believes that all patients found alive three years after the operation never had cancer. (See tables, pages 24, 25, and 26.)

Supra-vaginal Amputation.—McIntyre, ¹⁰⁹ _{Aug.} after studying the statistics of the results of both the vaginal and abdominal hysterectomy, claims that they are not justifiable operations. He recommends instead supra-vaginal amputation by means of the galvano-cautery, and followed by the application of caustics if necessary. Mason ¹⁶ finds that the results of complete removal of the uterus are not as good as after supra-vaginal amputation.

Sarcoma.—Terrillon ¹⁰⁰ _{Nov. 12, '90} has made a careful study of this affection, and divides it into two distinct forms,—one of the mucous membrane, the other interstitial. Sarcoma of the mucous membrane may occur in two forms: papillary and ulcerous. The papillary form never affects the cervix. When the sarcoma affects the mucous membrane, there is always a hypertrophy of the uterus. The cavity enlarges till it may become twenty centimetres long. In the ulcerative form the mucous membrane does not proliferate

EARLY VAGINAL HYSTERECTOMY.

NAME OF OPERATOR.	AGE.	DISEASE.	MANNER OF OPERATING.	DATE.	RESULT.	CAUSE OF DEATH.	ULTIMATE RESULT.	
							RECURRENT.	REMOVED.
1 H. J. Boldt, New York City.	50	Epithelioma of cervix.....	Ligation to broad ligament.....	April 5, '87	R.....	No recurrence.....	".....	".....
2	54	"	"	May 2, '87	R.....	".....	".....	".....
3	55	"	"	May 15, '87	R.....	".....	".....	".....
4	55	"	"	May 17, '87	R.....	".....	".....	".....
5	52	"	"	May 17, '87	R.....	".....	".....	".....
6	49	"	"	May 17, '87	R.....	".....	".....	".....
7	49	"	"	May 17, '87	R.....	".....	".....	".....
8	57	"	"	May 17, '87	R.....	".....	".....	".....
9	58	Edema of cervix and body.....	"	May 17, '87	R.....	".....	".....	".....
10	58	Cancer cervix.....	"	May 17, '87	R.....	".....	".....	".....
11	59	Cancer body.....	"	May 17, '87	R.....	".....	".....	".....
12	54	Cancer body, and left ovaries.....	"	May 17, '87	R.....	".....	".....	".....
13	54	Cancer body, and left ovaries.....	"	May 17, '87	R.....	".....	".....	".....
14	54	Cancer body, and left ovaries.....	"	May 17, '87	R.....	".....	".....	".....
15	45	Epithelioma of cervix.....	Ligation.....	Jan. 2, '88	R.....	Reurrence in three years.....	".....	".....
16	39	"	"	Jan. 22, '88	R.....	Reurrence March 25, 1888.	".....	".....
17	52	Prost. uterus.....	"	Aug. 27, '88	R.....	No recurrence.....	".....	".....
18	46	"	"	Feb. 5, '89	R.....	Still well.....	".....	".....
19	29	Cancer cervix.....	Ligation.....	Nov. 16, '89	R.....	Perfectly well.....	".....	".....
20	57	Papilloma cervix and posterior vaginal wall.....	" and foreope.....	Aug. 3, '90	R.....	No recurrence.....	".....	".....
21	47	Fibrosarcoma of uterus.....	"	Dec. 7, '97	R.....	Reurred in two months.....	".....	".....
22	58	Adenoma of uterus, cancerous degeneration.....	"	Mar. 5, '98	R.....	No return.....	".....	".....
23	43	Three small fibroids.....	"	Mar. 22, '98	R.....	Perfectly well.....	".....	".....
24	25	Cancer cervix.....	Forope and ligation.....	Mar. 25, '98	R.....	Cured.....	".....	".....
25	42	Chromyoma.....	Ligation.....	May 8, '98	R.....	Returned.....	".....	".....
26	82	Sarcoma uterus.....	" and foreope.....	May 20, '98	R.....	Cured.....	".....	".....
27	59	Sarcoma cervix.....	"	July 28, '98	R.....	Still well.....	".....	".....
28	48	Sarcoma.....	Forope.....	Aug. 4, '98	R.....	Delivery trauma.....	".....	".....
29	"	"	"	Aug. 8, '98	R.....	This patient refused to eat, two weeks after operation, and died in consequence.	".....	".....
30	53	Chrom. cervix.....	Ligation and foreope.....	Aug. 22, '98	R.....	Still well.....	".....	".....
31	51	"	"	Sept. 1, '98	R.....	Died in January, 1890.	".....	".....
32	36	Sarcoma.....	Forope.....	Sept. 15, '98	R.....	Disease relapsed in four months.	".....	".....
33	52	Carcinoma of cervix.....	Ligation.....	Oct. 20, '98	R.....	No recurrence.....	".....	".....
34	49	Fibrosa of cervix.....	Forope.....	Nov. 16, '98	R.....	Returred.	".....	".....
35	53	Cancer of cervix.....	Ligation.....	Dec. 18, '98	R.....	Well.	".....	".....
36	24	Abscess.....	Forope, and ligation.....	Mar. 3, '99	R.....	Became insane and died four months after operation.	".....	".....
37	52	Epithelioma uterus.....	Ligation.....	Mar. 13, '99	R.....	Well.	".....	".....
38	52	Prost. cervix.....	Clamp.....	June 19, '99	R.....	Well.	".....	".....
39	49	Adenoma, carcinoma corpus uteri.....	Clamp.....	Sept. 7, '99	R.....	Intestinal obstruction.....	".....	".....
40	50	Cancer corpus uteri.....	"	Dec. 16, '99	R.....	Intestinal obstruction.....	".....	".....
41	59	Epithelioma.....	"	Feb. 13, '00	R.....	Intestinal obstruction.....	".....	".....
42	50	Cancer cervix.....	"	Feb. 19, '00	R.....	Intestinal obstruction, fourth day.	".....	".....
43	50	"	"	Feb. 19, '00	R.....	Contracted kidneys.	".....	".....
44	36	"	"	Feb. 19, '00	R.....	Urinalysis.	".....	".....

EARLY VAGINAL HYSTERECTOMY (continued)

NAME OF OPERATOR.	AGE.	DISEASE.	MANNER OF OPERATING.	DATE.	RESULT.	CAUSE OF DEATH.	ULTIMATE RESULTS.	
							1890	1890
1. A. B. Carpenter, Cleveland, O.	44	Cancer of uterus.	Clamp	Dec. 20, '88	R.			
1. A. Palmer Dudley, New York City.	48	Epithelioma cervix.	Ligature	April, '89	D.			
1. E. C. Dudley, Chicago.	30	Carinoma	Silk ligature.	Nov. 19, '88	R.			
2	51	Sarcoma	Forces.	Nov. 20, '88	R.			
3	38	Carinoma	"	Nov. 22, '88	R.			
4	36	"	"	Nov. 23, '88	R.			
5	53	"	"	Jan. 9, '89	R.			
6	30	Malign. adenoma corp. uter.	Clamp	Aug. 6, '89	R.			
1. E. W. Cushing, Boston.	68	Carinoma cervix.	"	June 13, '88	R.			
2	43	"	"	Nov. 16, '88	R.			
3	66	"	"	Dec. 10, '88	R.			
4	26	"	"	Jan. 1, '89	R.			
5	38	"	"	Mar. 26, '89	R.			
6	40	"	"	Mar. 21, '89	D.			
7	41	"	"	May 14, '89	R.			
8	58	"	"	May 28, '89	R.			
9	25	"	"	Dec. 4, '89	D.			
10	50	"	"	Oct. 24, '89	R.			
11	45	Cancer cervix.	"	Feb. 1, '90	R.			
12	35	"	"	Mar. 26, '90	R.			
13	Geo. J. Engelman, St. Louis.	Carinoma fundus.	Found method.	1885	R.			
14	Cancer cervix.	Ligature.	1885	R.				
15	44	"	by catgut.	Jan. 14, '90	R.			
16	S. C. Gordon, Portland, Me.	Epithelioma	"	Feb. 28, '90	R.			
17	52	"	Silk ligature.	April 1, '90	R.			
18	40	Cancer of cervix.	Clamp	April 10, '90	R.			
19	46	"	Ligature.	May 30, '90	R.			
20	60	Carinoma	Partial extirpation.	Jan. 4, '97	R.			
21	49	"	Ligature and forceps.	April 16, '97	R.			
22	46	"	Forceps.	May 30, '97	R.			
23	45	Cancer cervix.	"	Nov. 8, '98	R.			
24	52	"	Ligature.	1886	R.			
25	36	Cancer cervix.	Clamp	1887	R.			
26	29	"	"	Dec. 1, '98	R.			
27	22	Washington, D. C.	"	Dec. 18, '98	R.			
28	43	"	"	Jan. 25, '99	R.			
29	52	"	"	1890	R.			
30	56	"	"	1890	R.			
31	31	East Claire, Wis.	Cerv. cervix and vagina.	Jan. 30, '98	R.			
32	40	Epith. cervix.	"	Feb. 2, '97	R.			
33	31	and vagina.	"	Feb. 23, '97	R.			
34	34	"	"	July 16, '97	R.			
35	4	"	"	Oct. 10, '98	R.			
36	5	H. Graf.	"					
37	1	Paus F. Minde, New York City.	Silk ligature.	Unknown.				
38	2	"	"	Unknown.				
39	3	"	"	Thought to be permanent cure.				
40	4	"	"	Died, eight months later, from disease.				
41	5	"	"	Died, one year later, from return.				
42	6	"	"	Died, in two years, from return.				

Note.—Died tenth day from hemorrhage. The patient was doing exceedingly well up to three minutes before death occurred.

EARLY VAGINAL HYSTERECTOMY (continued).

NAME OF OPERATOR.	AGE.	DISEASE.	MANNER OF OPERATING.	DATE.	RESECT.	CAUSE OF DEATH.		URINARY REVIEW.
						REMARKS.	REMARKS.	
1 E. E. Montgomery, Philadelphia.	40	Fib. cervix, Carcinoma body.	Clamp, forceps.	April 10, '88	R.	In good health.	Unknown.	
2	46	"	"	Feb. 14, '89	R.			
3	38	Fib. cervix.	"	July 15, '89	D.	Peritonitis, 14th day.	Doing well.	
4	45	Fibroid body.	"	Oct. 4, '89	R.			
5	49	Cancer.	"	Jan. 20, '90	R.			
1 H. O. Marcy, Boston, Mass.	43	Interstitial myoma.	Ligatures.	July, '90	D.	Shock.	Death, in twelve hours, operated upon by Dr. August Martin, of Berlin, while visiting the United States.	
2	45	Adenoma.	"	Sept. 20, '90	D.	Death, in twelve hours, operated upon by Dr. August Martin, of Berlin, while visiting the United States.		
3	39	Cancer cerv and body.	Clamp and ligatures.	Sept. 21, '91	R.	Recovery slow.		
4	45	Cancer cerv.	"	April 24, '91	R.			
5	34	"	"	Dec. 26, '91	R.			
1	77	Cancer supra- cervix.	"	Jan. 14, '92	R.	Still well.	Well.	
2	63	"	"	Feb. 19, '92	R.			
3	24	"	"	April 18, '92	R.			
4	39	"	"	Feb. 16, '93	R.			
1	47	Carcinoma.	Silk ligatures.	April 22, '93	D.	Peritonitis.	Death, in eight months, from return.	
2	66	Sarcoma.	"	June 1, '93	R.			
3	38	Cancer of cervix.	Clamp.	June 1, '93	R.			
4	38	"	"	June 1, '93	R.			
1	74	Cancer.	Ligatures.	June 1, '93	R.			
2	44	"	"	June 1, '93	R.			
3	44	"	"	June 1, '93	R.			
4	44	"	"	June 1, '93	R.			
5	6	"	"	June 1, '93	R.			
6	7	"	"	June 1, '93	R.			
7	8	"	"	June 1, '93	R.			
8	9	"	"	June 1, '93	R.			
9	10	"	"	June 1, '93	R.			
10	11	"	"	June 1, '93	R.			
11	12	"	"	June 1, '93	R.			
1	C. A. von Randolh,	33	Sarcoma of cervix.	Silk ligatures.	"			
1	J. New York City.	"	Epithelioma of cervix.	Clamp.	June 1, '96	R.		
1	J. Jefferson Temple,	68	"	"	Aug. 6, '98	R.		
2	Toronto, Ont.	37	"	"	Nov. 30, '98	R.		
1	Alex. J. C. Skene,	57	"	"	Dec., '98	R.		
	Brooklyn.						Died nine months later.	

or vegetate, but undergoes degeneration. There are also two forms of the interstitial variety,—one characterized by a hypertrophy of the entire uterus, as also an augmentation of the diameter of the uterine cavity; the vessels are greatly enlarged, and the affection is often liable to be mistaken for fibroma. The second form is more common; the sarcoma is usually quite circumscribed; it occupies the surface or the interior of the muscle. As it enlarges, its projecting part assumes the form of a glossy mushroom, with few protuberances, being connected with the body of the uterus by a pedicle. In this variety the uterus is always hypertrophied. Another variety of sarcoma is the cystic. It is formed in the mass of the tumor. In the cavities of the cyst a sanguineous liquid is found, containing shreds of sarcomatous tissue. The age of the patient appears to have a bearing upon this affection, varying from 30 to 50 years. It occurs more frequently in women who have never borne children. It grows very rapidly. The general condition of the patient is not much affected by the presence of the tumor. It is possible for a fibroma to degenerate into a sarcoma. The patients rarely live over two years. Death is due to compression from the size which the tumor rapidly attains; after removal relapse is the rule after six or eight months. The diagnostic symptoms are an almost constant sanguineous discharge, augmentation in the volume of the uterus, and notable enlargement of the cavity. The treatment consists in total removal. Its removal *per vaginam* is applicable only in incipient intra-uterine sarcoma, otherwise a supra-vaginal hysterectomy becomes necessary. When the total removal is contra-indicated, the local symptoms can be relieved by dilatation, curetting, and cauterization with chloride of zinc and perchloride of iron.

Pfannenstiel²⁴ reports a case of grape-like sarcoma of the cervix. It occurred in a woman of 53, who had always been healthy. She had two children and two abortions. The affection began, five years after the menopause (Mundé), with pains in the back and a discharge. Examination revealed a polyp in the vagina extending to the vulva. It was found to start from the anterior cervical wall. This was cauterized. One and a half years later it appeared again. This time it was removed with a sharp spoon and the cervix touched with a Paquelin cautery. Half a

year later it returned again, larger than before and in the form of masses. Microscopical examination showed it to be a sarcoma. The uterus was then totally extirpated. The patient made an excellent recovery. After another six months had passed the affection returned in the left half of the vaginal cicatrix. The author was only able to collect 11 cases in literature. In all of these cases the tumor assumed the shape of a bunch of grapes. This shape is due to the formation of numerous polypoid excrescences from the mucous membrane, and these become edematous. Microscopically, spindle- and round- cells are observed in the middle of normal connective tissue. Occasionally, smooth and striped muscular fibres and hyaline cartilage are seen. The growth forms upon the most superficial layer of the cervical mucous membrane, close to the os externum, and grows down in the vagina. It may affect the uterine body and the parametrium when of long duration. Death is usually due to cachexia and perforating peritonitis. In half of the cases it occurred in nulliparæ, coming most frequently at puberty and at the menopause. The symptoms in the beginning are discharge, increased menstruation, and irregularity of the menses. When the tumor increases greatly in size pressure symptoms appear. The duration of the disease is one and one-half to two years. It grows rapidly, and when removed returns in a few months. In no case, even where operation was performed, was a cure established. This was attributed to the fact that the diagnosis was made too late. Treatment should be early total extirpation of the uterus.

Kaltenbach,¹⁵⁴ Goodell,¹⁹ and Sänger and Müller²² all report cases of sarcoma upon which they had operated. In Sänger's cases the sarcoma was designated as of the decidual variety, or, better, sarcoma-deciduo-cellulare uteri. Chiari had seen 3 of these cases and Sänger 2. The symptoms are similar to those of carcinoma. Anatomically, the tumor is composed of polymorphous decidual cells, giant-cells, a pseudo-alveolar group, or a narrow-meshed net-work. The entire muscular structure becomes destroyed.

Sacral Resection for Malignant Disease.—The method known as Kraske's has been discussed by a number of writers, and reports of cases thus treated are given. Montgomery¹⁰⁰ advocates this method in malignant disease of the uterus and rectum. He makes

a bow-shaped incision from the right sacro-iliac synchondrosis across the median line to a little beyond the apex of the coccyx. The coccyx and right ala of the sacrum are removed, beginning just below the third sacral foramen. After removing the uterus, the peritoneum may be stitched over the vagina and the posterior peritoneal opening closed. Others advocating it are Goldmann and Czerny, ¹⁸ Terrier, ³ Lange, ¹, and Müller. ²¹⁴

Angioma of the Uterus.—Numerous microscopical examinations of uterine polypi were made by Wild. ⁸⁰ Two cases proved to be angioma, and consisted of thin-walled vessels and larger cavernous spaces filled with blood, and surrounded by a slight connective-tissue stroma containing here and there the remains of mucous glands.

Adenoma of the Uterus.—Malignant adenoma was formerly considered a very rare affection. Coe ⁶¹, has made observations which tend to disprove this fact. He states that there is but one variety of true adenoma, and that is the malignant. The positive diagnosis of malignancy is evinced by the fact that the disease is not confined to the mucosa and muscular layers. In differentiating it from carcinoma, he finds that the symptoms in the former are of longer duration, the pain is less, haemorrhage less frequent and less profuse, and that there is little or no foul-smelling watery discharge. In the cases observed (4) there was no glandular or perimetric involvement. The course of the disease is exceedingly slow, but if not removed is surely fatal. Total extirpation is the only treatment to be considered. Curetting appears to hasten the tendency to malignancy.

Tuberculosis of the Uterus.—Cases of this affection are reported by Duffan, ¹⁸⁸ Buscarlet, ⁷, and Haidenthaller, ⁸, who reports a case of tubercle of the cervix in a woman aged 29. A large ulcer could be seen on the anterior lip of the cervix, and an examination showed it to be a tubercle. The origin was attributed to disease of the tubes.

Lupus of the Uterus.—A description of a case of this affection is given by Zweifel. ⁸ The patient was 28 years old. The father died of consumption. Mother and sister healthy. Husband had had syphilis some years before marriage. The patient came for treatment with the diagnosis of carcinoma of the portio vaginalis. An examination of removed tissue showed it to be syphilitic

or lupous. Antisyphilitic treatment had no effect. She was then treated as a case of lupus of the vagina, curetted, and balsam of Peru and iodoform applied. This benefited the condition in the vagina, but the affection spread up to the uterus, incessant haemorrhages occurring. The uterus was then curetted. Tubercles were found in the uterine mucosa, but no giant-cells or tubercle bacilli. The patient disappeared from view for a time, but returned on account of haemorrhage, and consented to a total extirpation. Patient recovered from the operation, but the affection re-formed in the wound.

PELVIC CONNECTIVE TISSUE AND PERITONEUM.

Hæmatocele and Hæmatoma.—Burton²² and von Strauch²¹ urge the importance of differentiating these affections. A *hæmatocele* is a collection of extravasated blood in the pelvic cavity, a *hæmatoma* is an extravasation of blood in the connective tissue outside of the peritoneum; so that the latter may have its seat almost anywhere in the pelvis, whereas the former is almost invariably in Douglas's sac. Burton believes that all *hæmatoceles* are originally *hæmatomata*, but, owing to pressure, the peritoneum ruptures and blood escapes into the peritoneal cavity. If a large amount escapes then no encysting takes place. He does not believe, however, that all *hæmatoceles* are due to tubal pregnancy, but, when they are, they are usually fatal, because of the enlarged condition of the blood-vessels. The symptoms of *hæmatocele* are, briefly: rise of temperature, 104° to 105° F. (40° to 40.6° C.); diarrhoea, of a dysenteric variety; tenesmus; displacement of the uterus, usually downward and forward. In the early stage but little can be felt in Douglas's sac. Encysting usually takes place within forty-eight hours. The tumor can then be felt low down near the vaginal outlet. The blood rapidly clots and becomes hard. It feels at first like little prominences; later on it becomes a uniform hard mass, and nodular. Treatment is rest in bed, the induced current with large electrodes back and front or the negative pole in the vagina, using the constant current up to 50 milliamperes, beginning with 10. Burton reports 10 cases treated in this manner, all recovering.

Von Strauch states that a *hæmatocele* does not occur when the pelvic organs are perfectly healthy. If a *hæmatocele* forms, is not treated, and does not grow smaller in a month, it is advis-

able to empty it, for it certainly shortens the duration of the disease. If it suppurates, or if the patient's condition becomes more serious, it should be opened at once. He prefers the operation through the posterior vaginal wall to laparotomy, because of its simplicity and the excellent results obtained. The after-treatment should be as mild as possible. Von Strauch operates as follows: Thorough disinfection of the vulva and vagina; a long, free incision through the posterior vaginal wall; irrigation of the cavity with a warm salicylic solution (1 to 2000); packing vagina loosely with iodoform gauze. This plan to be kept up daily for ten days, after that every second day. For the first three days after the operation the patient is kept on her back, ice-bag on abdomen. He advises against curetting the sac; in fact, against using any severe measures, lest it rupture. Other methods recommended are laparotomy (Martin), an incision parallel to Poupart's ligament (Hegar, Pozzi), through the rectum (Crédé), and the sacral method (Kraske).

Homans⁹⁹ reports 2 cases of hæmatocele treated by incision through the posterior vaginal wall, and Hooper⁶⁷³ _{Apr.} a case treated by abdominal section. All of the cases recovered.

Veit⁸¹⁷ _{Nov.} distinguishes (1) free bleeding into the peritoneal cavity; (2) hæmatocele, viz., an encapsulated blood effusion in the pelvis; and (3) hæmatoma or hæmorrhage into the connective tissue in the pelvis. The hæmorrhage from the rupture of an extra-uterine foetalation takes place under a low pressure, for rarely are large arteries torn across. The bleeding generally takes place slowly. Usually clotting ensues, but this does not arrest the hæmorrhage. The vessel-walls do not contract, for they are poorly supplied with muscular fibres. If the abdominal cavity be healthy, the blood does not become encapsulated; but, on the other hand, if adhesions are present, the blood clots on them, and spaces are thus formed. The hæmatoma arises from hæmorrhage into the broad ligament. As far as treatment is concerned, the question as to whether the blood is encapsulated or not is important. Free blood in the pelvis cannot be recognized either by *palpitation* or *percussion*, whereas an encapsulated effusion can be made out. Encapsulated effusions are more favorable. The cases in which the signs of internal hæmorrhage are present and yet no effusion can be ascertained are unfavorable. Here abdominal section should be performed without delay. In other cases one ought generally to wait.

Parametritis and Pelvic Abscess.—The best treatment for subacute and chronic parametritis, according to Salvat,¹⁶⁴ is massage combined with electricity. From his experience he draws the following conclusions: 1. In cases of subacute and chronic parametritis positive intra-uterine galvano-caustic applications combined with massage has, in 3 cases, caused a rapid disappearance of painful symptoms and an active resorption of the exudates; after two or three *séances* the patients experienced such relief that they believed themselves entirely cured. 2. Adhesions have apparently softened more quickly than when treated by massage alone. 3. Leucorrhœa, which was present in these patients, disappeared rapidly, and the vigor of the parts was speedily restored.

The rarity of pelvic cellulitis has been demonstrated by many writers during the past year. Skene⁹ states that pelvic cellulitis may occur independently of peritonitis or salpingitis. It is usually caused by sepsis or gonorrhœal infection from the vagina or cervix, or is transmitted into the cellular tissue through the blood-vessels and lymphatics, or by contusions of the cellular tissue, causing extravasation and necrosis. Another, though rare, cause may be a pelvic apoplexy. The cellulitis may end in resolution or it may suppurate. The pus is nearly always discharged through the vagina, sometimes through the abdomen, or bladder, or rectum. It sometimes burrows through the sheath of the psoas muscle. The causes are certain constitutional conditions which predispose to inflammations of serous membranes, notably advanced renal disease and tuberculosis; next, rupture of a Graafian follicle, this probably having morbid contents; and, thirdly, exposure and excesses.

This subject has also been discussed and cases of pelvic abscess reported by Godfrey,¹²¹ Mackie,⁵⁵⁷ Warren,⁹⁹ Noble,⁹ Leon,¹⁹ Cushing,⁹⁹ and Macphatter,⁹ who advises rest in bed, no opium, small and repeated doses of sulphate of magnesia or Sedlitz powder. When absorption begins he uses small cantharidal blisters over the tumor. If the abscess has formed, he advises opening the abdomen rather than vaginal incision.

Vaginal hysterectomy for pelvic suppuration has been recommended by Segond,³ whereas Terrillon⁹⁰⁸ recommends trephining the pelvis at the most dependent portion of the abscess. The soft parts are separated posteriorly to and above the trochanter major, making an incision six centimetres long, extending down to the

bone. The wall is then trephined posterior to the acetabulum and above the spine of the ischium; a drainage-tube is inserted and kept in until the cavity is filled with granulations.

Peritonitis.—The chronic form of peritonitis may be due to a great variety of causes, and its anatomical characters are often widely different. Dunning ¹ states that it may be the result of one or more acute attacks, or may result from an extension of an acute and recurrent localized peritonitis, *e.g.*, recurrent appendicitis. The intermittent or continuous action of a local irritant—as, for instance, a subserous uterine fibroid, tubercular deposits, or cancer—may also induce a chronic peritonitis. Electricity has also been found to produce a chronic peritonitis, though how this does so we at present do not understand. Of the symptoms, pain is most constant. Dunning finds it most frequently in the left side, in the inguinal region, and extending obliquely upward. Elevation of temperature is also a pretty constant symptom. There is usually constipation (but there may be a diarrhoea) and painful and frequent micturition. In the way of treatment, he recommends iodide of potassium and small doses of mercury, quinine as a tonic, and, for the pyrexia (if periodic), laxatives, cantharides, blister over the most sensitive spot, and firmly-fitting abdominal bandage. Tuberculin is recommended for diagnostic purposes, and, as stated by Winter, it produces a general and local reaction and diminishes ascites. Opium is contra-indicated, except in extreme cases. Surgical interference sometimes gives the most satisfactory results. Dunning reports 8 cases. Price ¹³⁷ _{Nov., '90} reports 5 cases of puerperal peritonitis cured by laparotomy, and Stevens ⁶ _{May, '90} an interesting case of a child, 4 years old, who died of a peritonitis which, he believed, was due to a vulvo-vaginal catarrh.

Recurrent Pelvic Inflammation.—Dunning ¹ has investigated the subject of recurrent pelvic inflammation. The results of his experience led him to formulate the following conclusions: 1. In recurrent pelvic inflammation involving the uterine appendages abdominal section and removal of the appendages yield the greatest number of cures. 2. The surgical method, when compared with the non-surgical method, is a life-saving procedure. 3. Electricity cannot be relied upon to cure a large percentage of cases, yet so much benefit has been derived from its use in 50 per cent. of cases that it is a remedy worthy of trial in suitable cases.

4. Recurrent pelvic inflammation is not so fatal a malady as many would lead us to believe. Of the 50 cases reported, but 2 patients died as a result of the disease. Nearly all of the patients had suffered from the disease many years. 5. The disease tends strongly to produce chronic invalidism and sterility, and to result in the formation of chronic pelvic abscesses. 6. If there are no contra-indications, and a reasonable amount of non-surgical and electrical treatment has not been beneficial, there should be no hesitancy in performing the curative and life-saving operation of abdominal section and removal of the uterine adnexa.

ELECTRICITY IN GYNÆCOLOGY.

This subject has already been treated of under the different plans of treatment for the affections described on the previous pages. Its uses in general are well described by Hallowell.¹⁰⁵ Through its pain-annulling power it facilitates examinations, the faradic current of tension, or the positive galvanic pole, being placed in the vagina. In the early stage of subinvolution the faradic current of quantity and in the later stages positive galvanization is used. When the uterus is large and soft the positive pole should be introduced into the uterus, followed by a faradic current; when the uterus is hard and menstruation scanty and painful, the negative pole (100 to 150 milliampères); in haemorrhagic endometritis, the positive pole. He has had no success with electricity for the cure of displacements. Currier¹²⁰ gives, as objections to the use of electricity, the fact that it causes nausea, dizziness, and faintness, and is therefore contra-indicated in exophthalmic goitre and malignant diseases within the abdomen.

Martin,⁷⁷⁹ Goelet,²⁷ von Ratz,¹³² Strong,¹³² Nagel,²⁴ Kellogg,⁷⁶⁰ R. M. Murray,³⁸ Zweifel,⁶⁹ Prochownik,⁶⁹ Faquez,¹⁴⁸ and Sprague¹⁰⁰² all speak highly of its use in endometritis, subinvolution of the uterus, for the removal of pelvic inflammatory deposits, fibroids, displacements, especially anteflexion and retroflexion, metrorrhagia and menorrhagia, amenorrhœa and dysmenorrhœa.

MASSAGE.

The so-called Brandt method has met with much favor by those who have carefully studied it. It requires special study,—such as can only be obtained from Brandt himself. Vineberg,¹

who studied under Brandt, gives us an interesting history of Brandt's life and describes his methods. The examinations are made with the patient in the semi-squatting position, this greatly facilitating the ability to make a diagnosis. The finger in the vagina is kept stationary, and is used as a support. The thumb should not press against the pubes. The remaining fingers are partly flexed and glide over the glutei muscles, following the examining finger. The objects of the movements are: (1) to determine blood to the pelvis; (2) to act as a derivate from the pelvic organs; (3) to strengthen the muscles of the pelvic floor. Pelvic massage, or "daily systematic stretching," gives the most satisfactory results in old parametric and perimetrical adhesions. The massage is not interrupted during menstruation. In adhesions of tubes and ovaries good results are also obtained by employing massage. The tubes should always be massed toward the uterus. Brandt says that peri-oöphoritis is amenable to massage, whereas oöphoritis is not. This method also yields gratifying results in displacements. Besides the massage, he uses the so-called "lifting process." An enlarged uterus due to subinvolution is quickly made to assume its normal size by massage, and dysmenorrhœa and menorrhagia are often benefited by it. It causes a rapid disappearance of a pelvic hæmatocoele. Contra-indications are acute inflammations, cancer, and other malignant growths, and more than minute quantities of pus. Schurig⁴¹ divides massage into general and local. The general treatment consists in the Swedish movement cure, which is: (1) movements which start from the pelvis; (2) movements going to the pelvis; (3) general movements. These movements are carried out by the nurse and patients themselves, whereas Brandt does massage to the pelvis proper. This consists in: (1) massage strictly speaking; (2) stretching of abnormal adhesions and fixations; (3) straightening the uterus (redression); (4) lifting the uterus and pressing on the nerves; (5) separating and closing the knees. Nebel¹⁸ also speaks of massage, recommending it highly.

Taylor¹ describes a postural or lifting couch for relieving pelvic affections. The couch has two principal uses: it passively restores any displaced organ to its parts and removes obstacles in the local circulation, and it contributes actively and permanently to maintain these conditions. Massage is also employed in con-

junction with the posture assumed. Taylor states that he has obtained most gratifying results by this method, causing a rapid divulsion of morbid attachments and effecting a natural gliding movement of the peritoneal surfaces, thus obviating the recurrence of fixation.

NEW DRUGS AND INSTRUMENTS.

Ichthyl.—This drug has been largely employed during the past year, and it certainly relieves pain and causes a marked diminution of symptoms. Kurz⁵⁰ has had most gratifying results. He gives ichthyl pills, 1 decigramme (1½ grains) each, 3 to 5 a day. Tampons of 5 to 10 per cent. ichthyl glycerin, and local applications of the pure drug to the vaginal vault twice a week. Patients also receive capsules of ichthyl glycerin, 10 to 15 grammes (3 to 5 drachms), for introduction into the vagina, and the abdomen is rubbed with ichthyl ointment. He recommends the employment of this drug in pyosalpinx before attempting laparotomy. Others recommending it are V. Herff,⁵¹ Kotschau and Palmer.⁵² On account of its disagreeable odor, Gottschalk⁵³, recommends thiol as a substitute. This drug is comparatively free from odor, and is employed in the same manner as ichthyl.

Palmer speaks of the value of aristol, in the powdered form or in suppositories, for the relief of chronic vaginitis, pruritus, cervical endometritis, cervical erosions, and fissures. He also recommends hydronaphthol for peritoneal irrigation; iodized phenol for injections; resorcin and boric acid as an ointment for skin affections of the genitals, and internally for puerperal septicæmia; creolin for gonorrhœa and cystitis, and chloride of zinc, intrauterine, and tampons saturated with a 25- to 50- per-cent. solution applied to the os.

Lysol.—Michelsen⁵¹⁷ recommends this drug as an antiseptic for disinfecting hands, instruments, and for irrigation, using 1-per-cent. solutions. He preserves his catgut in 5-per-cent. solution.

Emmenagogues.—Oxalic acid is recommended by Marsh,⁷⁰⁰ who prescribes it as follows:—

R Oxalic acid, gr. xv (0.97 grammes).

Syrup of orange-peel, $\frac{3}{4}$ j (38.5 grammes).

Rain or distilled water, . . q. s. ad $\frac{3}{4}$ iv (120.00 grammes).

M. Sig.: One drachm (3.75 grammes) every four hours.

A. Glaze ⁷⁵⁶ _{Apr.} is in favor of the use of dioviburnia for the relief of dysmenorrhœa and amenorrhœa. His prescription is:—

R. Dioviburnia, 3vij (240.00 grammes).

Ferri et quin. cit., 3iiss (7.78 grammes).

M. Sig.: Dessertspoonful in water after meals.

Apiol and apioline are also strongly recommended for the relief of dysmenorrhœa and amenorrhœa by Hill ⁸¹ _{Apr.} and Delmis. ⁷³ _{Apr. 26}

Peroxide of Hydrogen.—The use of this drug is recommended by Duke ⁶ _{July 11} and Neely ⁵⁰⁶ _{Oct. 16} for the cure of leucorrhœa.

Instruments.—Duke has invented a combination of a curette and intra-uterine irrigator, which he calls a flushing uterine curette. A glass or tin vessel is filled with the required solution and hung up, this being attached by tubing to the curette. The fluid is passed through the hollow tube forming the handle, and thus the flushing and curetting are being performed at one and the same time. He states that there is no difficulty whatever in its introduction.

A roller-pessary has been invented by Madden, the advantages of which are its greater facility of introduction, greater certainty of filling the posterior cervical *cul-de-sac*, and the obviation of the constant pressure occasioned by the ordinary pessary. The new support affords no fixed point for the deposit of discharges or septic matter; there is also a greatly diminished risk of the pessary slipping out of its place. This pessary is applicable in all varieties of posterior displacements.

Kellogg ¹⁸⁵ _{Feb.} has invented a new instrument for the control of uterine haemorrhage. It consists of a double cannula, with a metal chamber at its distal end. The instrument is introduced into the uterus, so as to bring the metal-chamber in contact with the interior of the organ. A current of hot water, having a temperature of 170° to 180° F. (76.7° to 82.2° C.), is allowed to run through the instrument. One or two minutes' application controls the haemorrhage. Stillman ⁹⁹ _{July 22} and Wagerhagen have invented new vaginal specula.

Lefour ¹⁵⁴ _{July 1, 18} recommends a pessary, consisting of an aluminium cylinder five millimetres in diameter, its length to be at least five millimetres less than the length of the cervico-uterine canal. It has four longitudinal grooves to facilitate the exit of discharges. The two ends are soft, and five millimetres from one extremity there is a transverse perforation. It is introduced as follows:

Disinfect the canal, depress the perineum, draw the uterus down; then draw a curved needle, which has been threaded with horse-hair, through the neck of the cervix, passing it from without in and about five millimetres above the os externum on the left side; then pass it through the perforation in the stem, and from within out through the cervix on the right side. Tie the horse-hair firmly, the stem being thus kept in place.

MISCELLANEOUS.

Kelly²⁷ reports a case in which a physician introduced a pointed dilator into the cervix of an anteflexed uterus, pushing it through its wall, and then into the peritoneal cavity. This was followed by the introduction of a sponge-tent through the rent. A purulent peritonitis resulted. On the fifth day laparotomy was performed, but the patient died four hours after the operation.

Foreign Bodies in the Uterus.—Bunge²⁸ and Potter²⁵⁶ report cases of a hair-pin being pushed into the uterus. In Bunge's case the patient was in the third month of pregnancy, and an abortion followed. The patient was anæsthetized, and a hard body could be felt in the uterus at about the situation of the os internum. The cervix was drawn down, and with a long forceps the hair-pin was extracted.

Broome²⁹ reports a case of a living 7 months' child expelled from a uterus bicornis. In the twelfth week of conception, a violent hæmorrhage occurred *per vaginum*, and a tumor appeared in the left hypogastrium. Extra-uterine pregnancy was suspected, and the case treated expectantly. Three and a half months later a child weighing 3½ pounds (1440 grammes) was born, and four and a half months later laparotomy was performed for the tumor in the left ovarian region. The cyst was enucleated and a uterus bicornis discovered. The patient recovered. Jouin¹⁹⁴ reports 2 cases and Nitot¹⁹⁴ 1 case of uterus bifidus, in which one uterine cavity was normal and the other the seat of a metritis. Jouin calls attention to the rarity of these cases, and the difficulty of diagnosis.

DISEASES OF THE OVARIES AND TUBES.

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TUBAL DISEASE.

IN the discussion of tubal disease and its various causes, Rosthorn ⁴¹ considers four points: (1) the proportion of cases of disease of the uterine adnexa in gynaecological statistics; (2) their proportion as a result of puerperal processes and gonorrhœal disease; (3) the pathologico-anatomical types; (4) the diagnosis and symptomatology. Chrobak (in the Gynaecologico-Obstetrical Clinic), in 2002 cases, found 10 per cent. to be diseases of the uterine adnexa. In one-half of these there existed a swelling about the size of a walnut, the disease being most frequently found on the left side. A distinct idea of the gynaecological nature of the disease is not always afforded. In many cases the gonococcus was not found, though it was evident that the disease was the result of specific conditions. The gynaecologico-anatomical types of the uterine adnexa were: 1. Simple salpingitis (catarrhalis) or endosalpingitis, accompanied with swelling and redness of the mucous membrane and increased secretion. In such cases we find shedding of the epithelium and transformation of the mucus, thickening of the villi and slight infiltration of their walls, the tubes, therefore, showing a gradual swelling and being sensitive to pressure. These alterations are most frequently caused by the extension of the inflammatory processes from the endometrium. 2. Salpingitis isthmica nodosa, as described by Schauta and Chiari, where the swelling is not extensive, but appears in the form of knots. In salpingitis isthmica follicularis there is growth of folds of the mucous membrane, formation of pus-cavities, or of cysts of like character. 3. The condition is called salpingitis chronica vegetans when there is hypertrophy of the folds of the mucous membrane. 4. Salpingitis interstitialis leads to excessive development of the tube-wall. In other conditions we may have hyper-

trophy of the muscular tissue, but in this form it is an increase of connective tissue. 5. Salpingitis purulenta causes severe alteration; it may result early from peritonitis, and one is likely to find therein a pus-forming organism, such as streptococcus and staphylococcus. The bursting of the pus-containing tube leads invariably to peritonitis. The constant result of purulent and inflammatory processes is the appearance of pelvic peritonitis, with various adhesions and fixations. In the beginning the adhesions may be separated, but later this is not possible. The closure of the tube-mouth affords the pus no opportunity to discharge, and pyosalpinx results. The existence of tubo-ovarian cysts results from the intimate adhesions of the abdominal end of the tube with the ovary,—the development in the ovary of a cyst; the cyst-wall later ruptures into the tube. Hæmatosalpinx is not unfrequently associated with hæmatometra and hæmatokolpos. The condition may also arise primarily in the tube-wall, as in various poisonings and in the hæmorrhagic diathesis. The bursting of the tube filled with blood may result in the death of the patient through hæmorrhage or from a specific peritonitis. Hæmorrhage between the folds of the broad ligament occurs but rarely. Hydrosalpinx may develop without previous inflammatory processes in the tube. When the abdominal end of the tube is closed, the wall, in such cases, is likely to be very thin.

Landau and Rheinstein⁸⁵ state that in so-called salpingitis follicularis the walls show an almost alveolar structure. In salpingitis catarrhalis of long standing, one finds not only that the ciliated epithelium is lost, but that an extended erosion is present, which may lead to closure of the tube.

Stark,⁸⁶ in discussing pelvic inflammation and its causes, says that we may come to the following conclusions: 1. Idiopathic pelvic inflammation is a myth and a delusion; the inflammation is almost invariably secondary to uterine, tubal, or ovarian disease. 2. Most cases of known puerperal pelvic inflammation not due to traumatism are of gonorrhœal origin. 3. In the present imperfect state of our diagnostic resources, the establishment of a differential diagnosis must be, in many cases, mere pedantry. 4. In the present imperfect state of our therapeutic resources, the differential diagnosis is of but very slight importance.

In the consideration of the subject of tubal disease, it is of

interest to study the changes which these organs undergo under the influence of constitutional diseases. Popoff⁵⁸⁶ _{No. 19} reports having examined twenty Fallopian tubes in 10 women, 7 of whom died of relapsing fever, 1 of relapsing fever complicated with croupous pneumonia, 1 of typhoid fever, and 1 of croupous pneumonia. In all cases, the epithelial lining of the oviducts showed more extensive desquamation, the entire lumen of the tube being sometimes blocked by enormous masses of epithelial cells, lying in heaps or rolls about the base of the folds of the mucous membrane. Amidst these cells there were frequently seen structureless masses, varying in size and appearance. There were, also, heaps of red blood-corpuscles, and still smaller ones of leucocytes. The desquamation and accumulation of corpuscles were more marked in the outer or abdominal portion of the tube. The tube-capillaries and small veins were invariably gorged with blood, even large-sized veins being sometimes entirely blocked with blood-corpuscles. It can be readily seen that such changes must necessarily influence the subsequent functional action of the tubes in those cases which recover from the constitutional conditions producing them; but tubal disease is very probably more frequently a direct result of extension from the uterine mucous membrane.

Haultain,³⁶ _{No. 30} from the continuity of the tube with the endometrium, shows how evident it is that it would share in the inflammatory affections of that organ, and how it must be a connecting-link toward a similar condition of the ovary and peritoneum. "It may be inferred, therefore," says Haultain, "that the inflammatory state of the tube is generally secondary to that of the uterus. The lesions of the tube may be divided into three varieties: inflammatory, contortive, and combined. The inflammatory may be, first, inflammation of the lining membrane only, or endosalpingitis; second, inflammation of the deeper structures and interstitial salpingitis. The first may be catarrhal or purulent, and the latter is merely an aggravated stage of the former, the boundary-line between them being quite impossible to clearly define. The condition known as pyosalpinx is undoubtedly a frequent result of septic infection after labor or abortion, and it is probably now and then directly shown to be a complication or sequela of the zymotic fevers. Interstitial salpingitis gives rise to thickening of the tube-walls, which in many cases affects only the mucous and submucous

coats, producing an attenuated condition of the muscular fibres as a result of the expanding pressure of the hypertrophic submucosa. As will be seen in Fig. 1, the most frequent morbid condition probably met with is contortion of the tube; this may or may not be associated with inflammatory processes, which are generally,



FIG. 1.—TRANSVERSE SECTION THROUGH HYPERSTROPHIED TUBE. Muscular coat much attenuated. Muscle is represented by dotted line. (From nature.)
(*Edinburgh Med. Jour.*)

however, external to the tube itself, and are probably secondary. The contortion, as a rule, is a spiral, angular bending; so that, on making a longitudinal section of the entire tube, its lumen would be found appearing on different planes, as will be seen in Fig. 2. The examination of such a specimen under the microscope shows that the structure of the tube is perfectly normal; it has ciliated epithelium, with unchanged walls, except a

slight thickening in some cases, while the peritoneum runs smoothly over the surface, without dipping into the angles formed by the bending of the organ. One of the symptoms most likely to result from this condition is sterility. It may account also for the constant pain in the side, aggravated at the premenstrual periods. From the congestion set up by the bending of an organ of such great vascularity, and in whose immediate neighborhood such a



FIG. 2.—A. EXTERNAL APPEARANCE OF MUCH-CONTORTED FALLOPIAN TUBE, WITH PERITUBAL INFLAMMATORY THICKENING, GIVING APPEARANCE OF UNIFORM DILATATION OR THICKENING. B. LONGITUDINAL SECTION THROUGH SAME TUBE, SHOWING LUMEN OF TUBE CUT AT DIFFERENT PLANES AND AT SIX DIFFERENT POINTS. The peritoneum can be seen running smoothly over surface. (From specimen.)

(*Edinburgh Medical Journal.*)

large venous plexus as the pampiniform plexus is present, the etiology of the lesion is difficult of explanation, but may be understood if one considers the development of the organ before birth. The Fallopian tube presents an exactly similar state to the lesion now being considered (see Fig. 3), and it is not until puberty that it becomes straightened to its normal undulating form. This mor-

bid condition, it is quite probable, may be a continuance of the foetal state. In the majority of cases, however, it must be looked upon as a return of that condition, because the most frequent and marked examples are met with in women who have previously borne children. If we examine the Fallopian tube at full term, it will be found to have undergone a similar change to that of the uterus, viz., hypertrophy. This hypertrophy is one almost altogether of elongation. The tube, at term, is from six to eight inches, instead of the normal,—from four to five. One may naturally infer that if involution of the longitudinal fibres be incomplete the irregular twisting of the tube will result; its loose attachments to the layers of the broad ligament offer little or no resistance to the tube curling up between them. That this angulation of the tube is the cause of this occlusion in many cases I am convinced. I have had an opportunity of examining but 4 cases, in 2 of whom it seemed the direct cause. In a large number of cases of pathological conditions of the tubes in pregnancy, in which dilatation of the tube has occurred and it is filled with fluid contents, which indicates that the uterine cavity, by the still patent undilated portion of the tube, can only be accounted for by this angulation being the cause of the retention, and its having been straightened out in the process of exploration by the probe or bristle." In conclusion, Haultain says (1) that simple contortion of the tube is an extremely common condition; (2) that it manifests itself as a spiral angular bending; (3) that it may occur independently of any inflammatory or any other apparent morbid

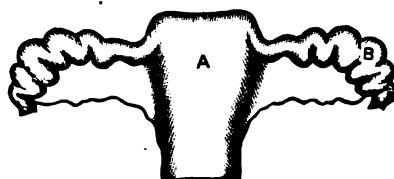


FIG. 3.—NORMAL UTERUS AND FALLOPIAN TUBES OF EIGHTH-MONTH FETUS, SHOWING SPIRAL DISPOSITION OF TUBES.
(From specimen.)

(*Edinburgh Medical Journal.*)

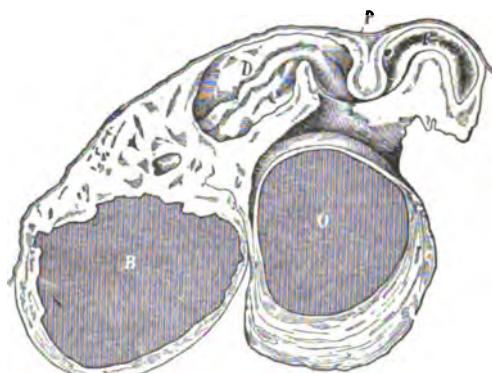


FIG. 4.—MARKED ANGULATION OF TUBE, CAUSING DISTAL DILATATION OF ITS LUMEN. (From specimen.)
D, fimbriated extremity, adherent to blood-cyst; B, blood-cyst; O, ovary; P, peritonenum running smoothly over convolution.

(*Edinburgh Medical Journal.*)

change; (4) that when associated with surrounding inflammation it is more probably the cause than the result of that process; (5) that it is either congenital or acquired, the former being a maintenance of the normal foetal condition, while the latter is frequently the result of subinvolution after pregnancy; (6) when associated with the secondary endosalpingitis, it disposes toward encysted pyo- or hydro- salpinx, from the retention of the secretions, and this gives rise to the lobulated condition of many of these tumors; (7) in itself it is sufficient to give rise to the stereotyped signs and symptoms of disease of the appendages, viz., sterility and pre-menstrual dysmenorrhœa.

G. Halley¹⁰² would divide pelvic inflammations into (1) those that have their origin in the Fallopian tubes, through some decomposing substance in the cavity of the uterus; (2) those that result from pelvic haematocele; (3) those that result from suppuration in the ovary itself. The latter, in the majority of cases, is probably of secondary origin. With such classification, we are naturally confronted with the question as to how the disease has reached the tube. Bell²²,_{Apr. 8} claims that, according to his experience, neither diseases of the Fallopian tubes or ovaries tend to development without some pre-existing affection of the uterus. If this disease of the uterus exists, it is only reasonable to infer that there can be no tendency on the part of the diseased organ to recover; while, on the other hand, the probability of resolution taking place in the adnexa may reasonably be expected if the primary disease is removed, and this he makes the basis of his method of treatment. He excludes, however, cases of traumatic disease, in which he would include gonorrhœa. Treatment consists in regulating the condition of the uterus and bowels.

The same idea is held by Duncan,²¹, who says that chronic salpingitis is due generally to extension of catarrh or purulent endometritis; sometimes, however, it is doubtless secondary to the pelvic peritonitis, and salpingitis may exist for an indefinite period, the exuded fluid gradually making its way through the patent uterine end into the uterus. When the inflammation extends to the abdominal end, a little of the fluid escapes into the peritoneal cavity and sets up a pelvic peritonitis, more or less severe, according to the virulence of the exudation. Within, the ostium is closed by adhesions, and the tubes are transformed into closed

sacs by the uterine opening also becoming closed. The further changes depend upon the character of the primary inflammation, if catarrhal or due to peritonitis. Serous fluid collects in the tube; its coats become thin, forming a hydrosalpinx. When the inflammation has been purulent the same change occurs, except that the contents consist of pus, and the condition is called pyosalpinx. If the capillaries become gorged with blood and rupture, it is known as hæmatosalpinx, intermittent hydrosalpinx, or pyosalpinx, when

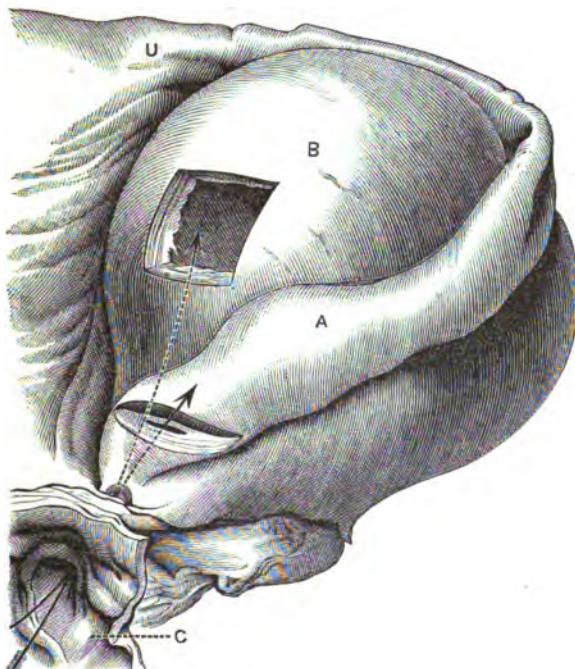


FIG. 1.—TUBO-OVARIAN ABSCESS. The tube and abscess each communicate with the rectum.
(*London Lancet.*)

the uterine end remains patent and the sac occasionally empties itself.

As to the influence of gonorrhœa as a cause of pelvic inflammation, Bantock² discounts its importance, and says that in a limited number of cases it seems to be capable of producing the most serious symptoms; rarely, however, terminating in death, its importance being diminished by the fact that these cases are comparatively very rare.

Course.—J. Bland Sutton^{6, 70} states that in severe cases of

salpingitis, after occlusion of the abdominal ostium, accompanied with stricture in the uterine end of the tube, the pus is as securely locked up in the tube as it would be in a deep-seated abscess, and follows the course of an abscess; the walls gradually thin, the inflamed tube becomes adherent to the surrounding structures, —ovary, uterus, rectum, intestines, or broad ligament. The wall of the tube continues to become thin, until, on some slight exertion, it bursts. If the pus is discharged into the peritoneal cavity, it establishes rapidly fatal peritonitis.

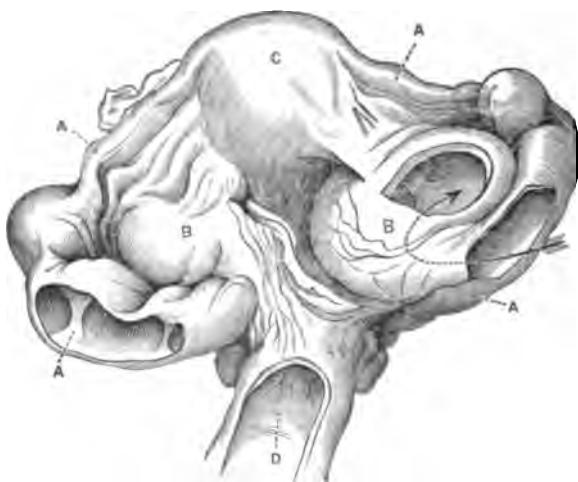


FIG. 2.—A TUBO-OVARIAN ABSCESS.
(*London Lancet.*)

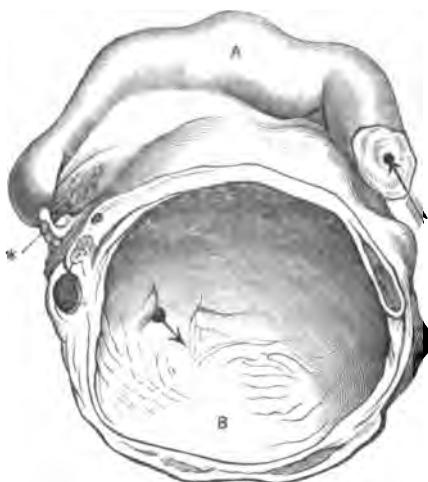


FIG. 3.—A TUBO-OVARIAN ABSCESS.
(*London Lancet.*)

Right pyosalpinx is very prone to open into the rectum. (See Fig. 1, page 7.) When the sac lies in contact with the bowel its pus becomes abominably fetid, due to osmosis of the intestinal gases. The first effect of salpingitis upon the ovary is to cause thickening of its capsule, and, if lymph is effused on the surface, this may organize and result in the extensive perimetral adhesions. This at first prevents the rupture of ripe ovarian follicles, and the tension gives rise to considerable disturbance and pain. As enlarged follicles cannot discharge their contents, it naturally follows that each secretion of the ovary, which has long been the seat of oöphoritis, will be found largely converted into cystic collections, and two or more may become confluent and

cause a cyst the size of a walnut; such a cyst may become adherent to the dilated pus-containing ampulla of the corresponding tube, and thus give rise to a tubo-ovarian abscess. The communication, in such cases, is usually small, and barely admits a probe. When a tubo-ovarian abscess communicates with the rectum, it has a portion of the abscess lodged in the ovary that invariably becomes the seat of the fistula, as can be seen in the figures. The pus is discharged, by way of the rectum, at

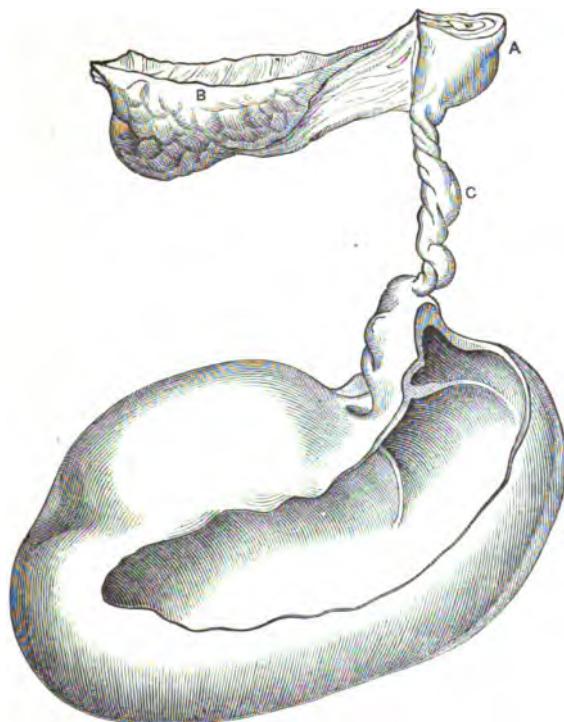


FIG. 4.—A HYDROSALPINX WITH TWISTED PEDICLE.
(*London Lancet.*)

irregular intervals, and is of great importance in the patient's symptoms. A pyosalpinx may resemble a chronic abscess and give rise to few symptoms. This form sometimes becomes slowly and forcibly dilated with fluid, and is transformed into a hydrosalpinx. The reasons for this belief are as follow: (1) hydrosalpinx is not found in acute cases; (2) in many chronic cases hydrosalpinx is found on one side of the uterus and the progressive salpinx on the other; (3) the ampulla of a tube will sometimes be

dilated into a hydrosalpinx, while the isthmus contains pus; (4) the fluid contained in a hydrosalpinx will sometimes be colorless, but the recession of the tube contains caseous material and cholesterol; (5) the dilated tube in a hydrosalpinx may, as in a pyosalpinx, communicate with the ovarian follicle, to form a tubo-ovarian cyst. The shape of the typical hydrosalpinx is very characteristic, and, though not invariable, is fairly constant, like that of the legume, with somewhat broad ends. The ovary always occupies the concave border of the ligament, and the bent shape of the cyst is doubtless due to the traction exercised by the tubo-ovarian fimbria or legume. In some specimens, the situation of the ostium is indicated by the depression, in which a series of folds radiate (see Fig. 4, page 9), reminding us of the ridges and furrows on the

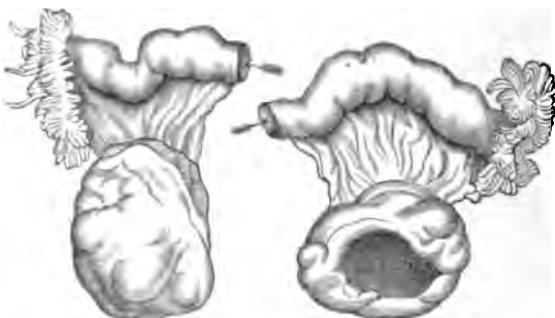


FIG. 5.—CONGENITALLY ILLY-DEVELOPED AND CYSTIC OVARIOS.
(*London Lancet.*)

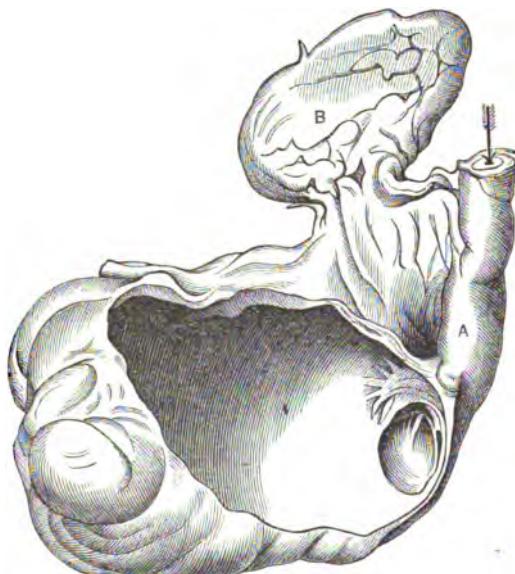
face of the stump after a circular amputation through the thigh or arm. In hydrosalpinx the tubes rarely attain a large size, due to the fact that, as the tubes distend, the tubes and muscular coats atrophy. The largest examples of hydrosalpinx Sutton has ob-

served have not exceeded six inches in length, with a diameter of three inches. The walls become so thin that it is difficult to remove them without rupture; just as ovarian cysts are prone to undergo axial rotation, so it may occur in connection with hydrosalpinx. A cyst of this character is shown in the figure, the contents of which were of a chocolate color; the tube between the uterus and cyst was twisted tightly three times and a half; the cyst-wall was bound with strong adhesions.

Sutton² also says that when the Fallopian tube is affected with salpingitis of a mild type, though sufficient to produce salpingitic closure of the ostium, the ampulla and the tube may be slightly distended with fluid, due to their transudation from the walls or the glands lining its membrane. The walls slowly thin by the continued pressure exerted by the accumulated fluid, and at length the tube

forms a bean-shaped cyst, with delicate, translucent walls. The situation of the ostium is indicated by a dimple, from which a series of folds and burrows radiate. The uterine end of the tube is easily permeable and the ovary readily recognized. This condition is called hydrosalpinx, but, unfortunately, the term has been used to distinguish other conditions; for instance, specimens occasionally come to hand in which an ampulla of the tube is widely dilated and communicates with the cyst, replacing the ovary. This condition is loosely called hydrosalpinx; it is more correctly termed a tubo-ovarian cyst. In these cases the ostium is closed and the tube slowly transformed into a retention-cyst, which subsequently adheres to and, by absorption, the result of continuous pressure, communicates with the like cyst in the ovary. Frequently we meet with distended tubes communicating with the cyst, replacing the ovary. The cavities are filled up with pus. Such are called tubo-ovarian abscesses. The walls of the tubes and cysts are usually thick, and the orifice of communication is often narrow,

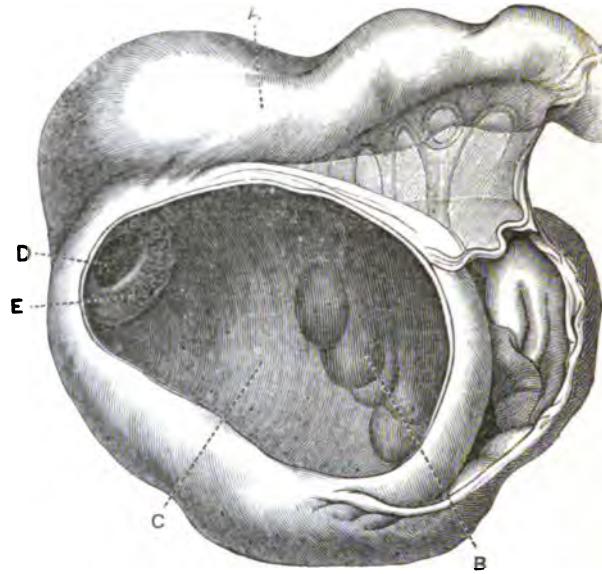
seldom admitting anything larger than an ordinary-sized probe. Another condition, quite distinct from either of these, we call hydrocele. In Fig. 3 the tube is easily dilated toward its ampulla, and then opens into the wide orifice the size of a neck; projecting into the floor of the cyst is a portion of the ovary; the remainder of the ovary, though adherent to the cyst-wall, lies outside the cyst and presents a recent corpus luteum. The cyst can be separated from the peritoneum, forming a mesometrium; indeed, its wall is directly continuous with it. On examining the orifice by which the tube and cyst communicate, we notice some small, atrophied,



HYDROSALPINX.

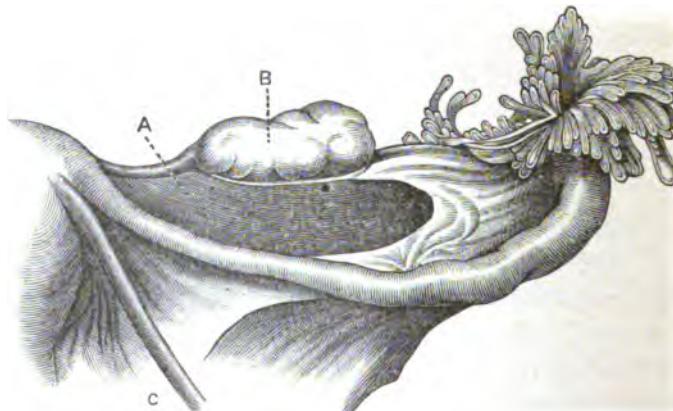
(London Lancet.)

but unmistakable fimbria. This hydrocele may attain a large size. Sutton once removed one which contained 3 pints (1½ litres) of



AN OVARIAN HYDROCELE.
(*London Lancet.*)

fluid. Intermittent ovarian hydrocele differs from the hydro- or pyo- salpinx in the fact that the fluid it contains sometimes escapes



A SKETCH OF THE MESOMETRUM, SHOWING THE OVARIAN POUCH.
(*London Lancet.*)

through the tube into the uterus and is discharged externally. In the human family the ovary lies in a shallow recess in the posterior

aspect of the mesosalpinx. This recess is the ovarian bursa or pouch. It varies greatly in depth, in some cases being small and inconspicuous, in others deep enough to accommodate the entire ovary. In the virgin the ampulla of the tube falls over the mouth of this recess and conceals the ovary. This relation is usually disturbed in the first pregnancy. The relation of tube, pouch, ovary, and uterus is shown in figure. In the lower animals every variation is found, from the shallow pouch in the human family to the closed sac excluding the ovary from any communication with the peritoneal cavity. The most perfect sacs exist in rats and mice. A transverse section through the ovary of the mouse is shown, where it will be seen that the peritoneum bears precisely the same relation to the ovary that the tunica vaginalis bears to the testis. The tunica vaginalis testis often becomes distended by fluid, and is termed hydrocele, while the testicle projects to the floor of the sac. In long-standing cases of hydrocele, the testicle, after long-continued pressure, becomes flattened, and may subsequently atrophy. The existence of the tubo-vaginalis in the ovaries of animals has long been known, and Sutton has succeeded in obtaining evidence of the occurrence of hydrocele in the mare, guinea-pig, and white rat, in addition to several specimens obtained from women. It is an important fact to be remembered, that when the Fallopian tubes become distended by fluid accumulations or by the impregnated ovum, the uterine cavity becoming distended either from the developing embryo or by accumulation of retained mucus or myoma in its walls, the uterine tissues atrophy. The hydrosalpinx may be distinguished from the parovarian cyst in the fact that the latter always burrows between the layers of meso-



TRANSVERSE SECTION OF THE OVARY AND OVARIAN SAC
OF A MOUSE. (After Robinson.)

(*London Lancet.*)

salpinx. When the cyst is very large, and has a capacity of 20 to 50 ounces (600 to 1500 grammes), the tube is stretched across the cyst and will measure forty centimetres in length. Its lumen is not interfered with and the abdominal ostium remains patent, being represented by a few atrophied fimbria. The tubo-ovarian ligament is there easily detected and the ovary usually somewhat enlarged and flattened. The Fallopian tube never communicates with the interior of the parovarian cyst unless some accident affects the cyst, which may lead to perimetrical closure of the ostium. True ovarian cysts never burrow between the layers of the mesometrium. The Fallopian tube generally lies curled up on the cyst; the ostium may be perimetricaly sealed up by inflammation, the tube-wall thickened, but the tube never opens into the cyst. Many unilocular cysts, often classed as ovarian, are in reality parovarian. The relation of the tube to the cyst offers a ready mode of discrimination; even when an ovarian cyst suppurates, the tube does not communicate with its interior.

Symptomatology.—Morison²² says the symptoms characteristic of inflammatory disease of the appendages are: (1) the history of recurrent attacks of peritonitis; (2) haemorrhage; (3) pain. Patients suffering from diseases of the tubes are likely to have frequently recurring attacks. One patient in his experience, a case of hydrosalpinx, had eleven attacks of pelvic peritonitis in four years. Pain, as a symptom, should be regarded with suspicion, and the case should be subjected to operation only when it is evident that it is associated with physical signs of disease.

Pyosalpinx.—Zweifel,¹³² speaking of the etiology and course of tubal disease, recognizes four different forms of pyosalpinx. In cases in which streptococcus and kapselcoccus were found, there was often, every evening, marked remittent fever. In cases of tubercular pyosalpinx the fever rose from time to time; wherein it differs from gonorrhœal pyosalpinx, in which there was usually no fever at all when the patient was lying quietly in bed. If disturbed by the examination, the temperature rose at once and shortly after fell. In no case of gonorrhœal pyosalpinx was there swelling of the inguinal glands, while in pyogenic cases swelling was the rule.

Martin⁹⁹ reports having examined the contents of the tubes in 26 cases of pyosalpinx. In 8 he found bacteria of various kinds, in 3 cases the characteristic gonococci of Neisser. He says the

question whether the gonococcus of Neisser—which has a special predilection for mucous membrane of cylinder epithelium, and is found under occasional conditions in pavement epithelium—can, if placed in an active state on the peritoneum, cause a true gonorrhœal peritonitis cannot be settled until a large number of well-proven cases are at hand.

Pyosalpinx, according to Noble,²⁰² is (1) not necessarily a bar to conception ; (2) discovered after a given labor, may have existed prior to the pregnancy and not be of recent origin. The latter fact is of special interest, because of its bearing upon the causation of so-called puerperal fever. Hinkson¹ reports a case of pyosalpinx, with adhesions to the vermiciform appendix, bladder, small intestine, and omentum. Lafourcade⁷ reports a case of purulent salpingitis, with secondary abscess in the broad ligament, the latter probably produced by a small communication.

Hæmatosalpinx.—Martin¹⁰⁰² says there are three theories as to the causation of hæmatosalpinx: (1) the backward flow of blood from the uterus, owing to atresia of the uterus or vagina; (2) the fimbriated extremity of the tube becomes attached around the follicle, and hemorrhage takes place into the tube; (3) the blood-vessels of the tube rupture, and, owing to a closed condition of both the uterine and fimbriated extremities of the tube, the blood collects in a manner somewhat similar to pyosalpinx, but differing from it, in that pyosalpinx is not necessarily increased, while hæmatosalpinx increases with each menstrual period.

Tubal Fibroma.—A case of fibroid disease of the tube, or a fibro-myoma development in the broad ligament, investing the tube, is reported by Schwartz. The tumor attained the size of an egg, and was attached to the tube by a pedicle one inch long and as thick as a man's finger. It occurred in a woman 54 years of age.

DISEASES OF THE OVARIES.

Chronic Ovaritis.—Duncan⁶ believes that chronic ovaritis may be secondary to the acute form, or may be due to the extension of the inflammation from the uterus and tube, or as a result of peritonitis or peri-ovaritis. The latter is not an uncommon cause. The ovary gets bound down by adhesions, which, after a time, contract and produce cirrhotic conditions as a result of the chronic inflammation (Fig. 1). In other cases the ovary is

enlarged, and, as a consequence of the chronic inflammation, there is increased development of fibrous tissue in the stroma (Fig. 2); with the formation of small cysts, in either case, ovulation can only proceed with great difficulty, and the follicles, as

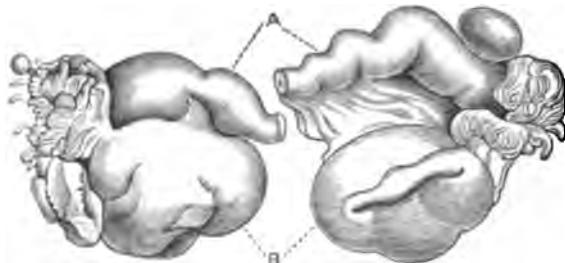


FIG. 1.—OVARIES AND TUBES MATTED TOGETHER BY ADHESIONS. Ovaries cirrhotic; coats of tubes thickened from chronic salpingitis.

(*London Lancet.*)

suffered from dysmenorrhœa, and, if married, are sterile. Fig. 3 represents a specimen from a patient 21 years of age, who suffered from intense dysmenorrhœa; menstruation began at 17; flow

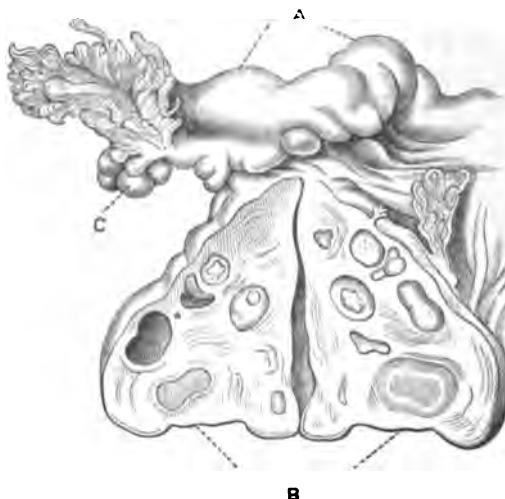


FIG. 2.—CHRONIC OVARITIS AND SALPINGITIS. Tube thickened; ovary hypertrophied, fibrous, and full of cysts in interior.

(*London Lancet.*)

removal of the ovaries was attended with complete relief. When enlarged ovaries and tubes are matted together with old pelvic adhesions (as in Fig. 3), they give rise to a firm, roundish or elongated tumor, felt in one or the other posterior quarter of the pelvis, and, perhaps, extending somewhat behind the uterus.

they enlarge, may be enabled to reach the cortex. Congenitally ill-developed ovaries are not common; when present, the uterus is also ill developed. These conditions are found in women who have suf-

fered from dysmenorrhœa, and, if married, are sterile. Fig. 3 represents a specimen from a patient 21 years of age, who suffered from intense dysmenorrhœa; menstruation began at 17; flow was always very slight, lasting for two days. The pain was described as fearful agony, which began a week before the period and reached its acme two days after the period was over. The uterus was slightly and acutely anteflexed,—two inches in length. The canal was dilated up to No. 12, Hegar; subsequent to this, the following two periods were less painful, when all the old trouble returned. The

These cases were formerly described as pelvic cellulitis, and it is only since the development of abdominal work that their true character has been made known.

Ovarian Varicocele.—A case of this condition is reported by Petit,²⁴ as occurring in Pozzi's practice. The woman was 32 years of age; menses began at 14 and continued regular until 18, when she married. She had 5 children at term; after the fifth labor, which occurred four years before the operation, periods began to be very irregular. Four months before she came under Pozzi's care there was almost constant metrorrhagia. Cervix was free from laceration, and was sclerosed; os, patulous. The uterine cavity was nearly four inches long; patient was getting very weak, and an exploratory incision was made, without, however, finding any fibroid. On both sides the venous plexus was much enlarged, the ovaries as large as hens' eggs. Guéniot,²⁴ maintains that stays and heavy manual labor give rise to this trouble, and that the disease is not rare in fibroid tumors of the uterus.

Ovarian Pain.—Coe⁴³ says there is no reason why neuralgia may not occur in the ovary as well as in any other portion of the body. It is most probably due to extra- rather than to intra-ovarian causes. It is frequently produced by peri-ovarian adhesions. He reported a case which was undoubtedly of malarial origin, and which was cured by large doses of quinine. Rendu¹⁴ discusses 2 cases of long-standing pain, evidently caused by the impaction of a small cyst in Douglas's pouch; the removal of the cyst resulted in the disappearance of the pain.

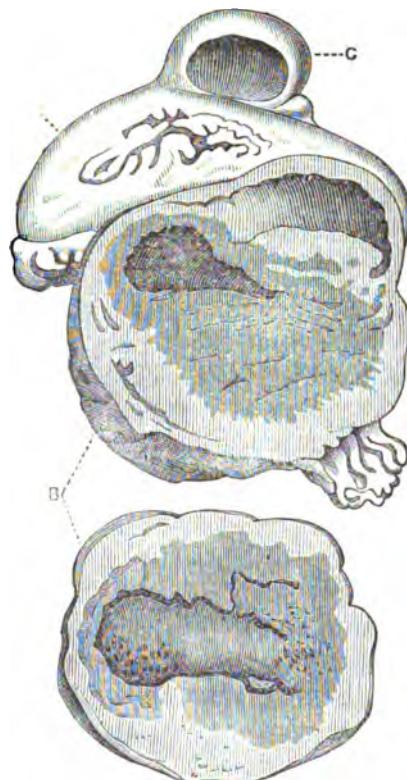


FIG. 8.—CHRONIC PERITONITIS. Ovary and tube matted together; ovary (shown in section) much enlarged and full of blood; tube dilated.

(*London Lancet.*)

Dermoid Cysts.—Potter⁸⁵⁶ reports a dermoid cyst in a woman 60 years of age, the tumor having been noticed for about four years. A bunch of hair was found in the cyst, about the size of a walnut, about eighteen inches in length, and of a brilliant red,—so brilliant, indeed, as to have made any red-headed girl proud to have claimed it as her own. Page² removed an extra-peritoneal dermoid cyst by an incision made across the perineum, between the anus and coccyx; the tumor weighed 3 pounds. Ricard¹⁰⁰ reports a case of dermoid ovarian cyst, which occasioned occlusion of the colon, from which the patient recovered after the removal of the cyst. Mundé¹⁰⁰ found a switch of hair five feet long in a dermoid cyst removed from a single woman 41 years of age. A dermoid tumor occupied each ovary, the right one being as large as a pregnant uterus of six months and containing this switch of hair; the other presented a small bale of hair and several teeth. The switch sprung from a small nipple-shaped protuberance at the lower part of the sac, which was unilocular at its root, not more than an inch in diameter, enlarged to a rope of hair as thick as the forearm. In the past year I removed a double dermoid ovarian cyst from a girl 11 years of age, who had suffered from the presence of the tumor since she was 8 years old. The tumor contained sebaceous material, hair, bone, teeth, cartilage, and a well-defined half of the upper jaw, covered with mucous membrane and with a row of teeth.

Shoemaker²³ reports a case of ovarian dermoid, which was developed in the ovary of the left side and migrated to the right side, over the region of the kidney; the left Fallopian tube was elongated to eleven inches.

Ovarian Cysts.—In the last ANNUAL I enumerated a number of cases of large ovarian cysts in which death had resulted upon removal. Cartledge,²²⁴ in the consideration of large, unilocular cysts, states that Estes removed one in 1887 which weighed 125 pounds; the patient recovered. Kelly¹⁰⁴ reports an ovarian tumor weighing 100 pounds, and another²⁷ weighing 116 pounds; the patients recovered. Goodell⁹ removed one which weighed 112 pounds, with recovery of the patient. Keith² had a case weighing 95 pounds; the patient died. Ramsay successfully removed a 95-pound tumor from a 55-year-old woman. Spencer Wells removed a cyst of 125 pounds, with recovery of the patient.

Twisting of the Pedicle.—A not unfrequent complication of ovarian tumor is the axial rotation of the tumor, by which its pedicle becomes twisted and the circulation interrupted. Robinson¹ reports 5 cases of rotation of the axis in tumors occurring in the practice of Lawson Tait; in the first case the tumor doubled its size in three days. This is due to the fact that a tumor with a pedicle capable of being twisted will allow the arterial blood to be pumped into it long after the venous blood is cut off; as a consequence, the capillary vessels become much distended and rupture, causing the filling up of the tumor with blood and serum. The rapid increase in size of the tumor, consequently, should cause one to be on the alert for twisted pedicle or rotation of the axis. In the case narrated, the pedicle was found to be twisted four times and the tumor in a condition of gangrene; the second case was in a woman 78 years of age, and resulted from a twist of the body while getting into bed. The tumor was rotated on its axis between three and four times. The patient made a good recovery. In the third case the tumor was strangulated and gangrenous; the pedicle rotated five or six times. In the fourth case the tumor was found filled with pus, and its pedicle was twisted like an umbilical cord. It is probable that the twisting here was gradual. In the fifth case the tumor was rotated so that it was almost deprived of nutrition through the pedicle, and was receiving its nutrition through its walls. This case occurred two weeks following labor, to which it was probably due.

Tuholske⁶⁵ reports 2 cases; in one the pedicle was twisted one and a half times, the other two and a half times; adhesions were found high up on the omentum, were firm, and could not have been formed after the pains began; in either case the adhesions were caused by twisting. Taylor² reports a case of twisted pedicle, the diagnosis being founded upon the enlargement of a cystic tumor, previously of ordinary size, presumably ovarian, situated high in the abdomen, and therefore possessing a long pedicle, and the constant occurrence of abdominal pain, together with marked and rapid increase in size of the tumor. Russel²⁶ reports the case of a patient, operated on by Lawson Tait for papillary ovarian cyst, who had been tapped ninety-three times, removing altogether about 930 pints (465 litres) of fluid.

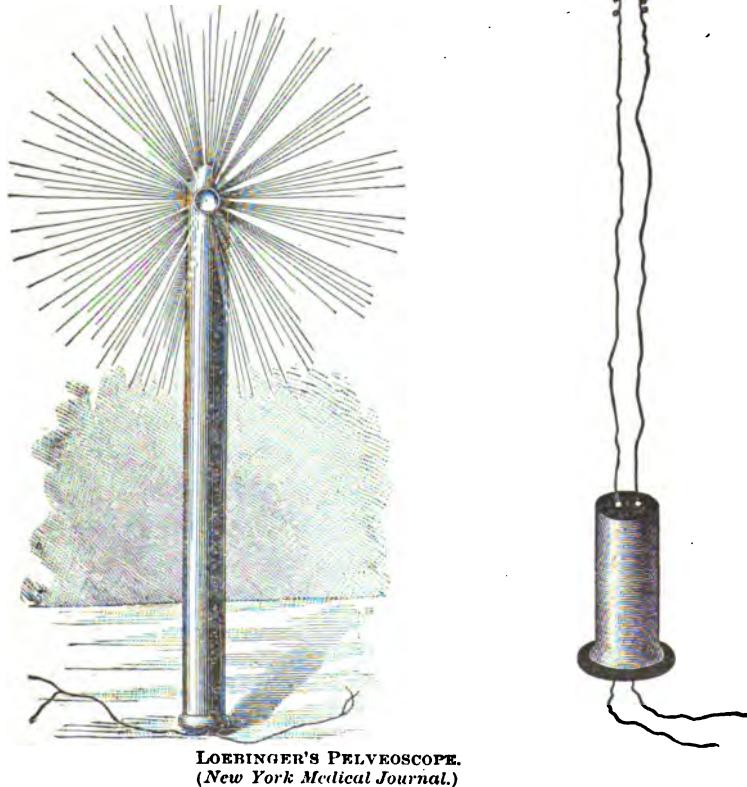
Diagnosis.—In very many cases it is exceedingly difficult to

determine the actual pathological changes which have taken place within the cavity of the abdomen. Smith² had a patient upon whom an operation was begun for supposed pelvic abscess, which proved to be a pyosalpinx with tubercular deposits. He emphasizes the importance of prompt operation, in all such cases, to prevent the development of tubercular trouble. Montgomery,¹⁹ in the discussion of sepsis following labor or abortion, after careful examination, eliminating the possibility of the poison entering the system through lesions of the vulva, vagina, and cavity of the uterus, advocates thorough examination of the cavity of the pelvis, to ascertain whether it does not contain the centres from which the septic products are being absorbed, and, in cases of doubt, of opening the abdomen with a view to completing the diagnosis and correcting the condition. Olenin² reports a woman, 43 years of age, who had suffered from pain in the hypogastrium for two years. Abdominal section was done for supposed ovarian tumor, when innumerable hydatids were found disseminated in the usual manner over the omentum, and also in the substance of the liver. The largest was a cyst as big as a child's head, and situated in the pelvis.

Edebohls^{1,20} recommends exploratory puncture in determining the diagnosis of uncertain conditions of the pelvis. He has practiced it in over 70 cases, without unpleasant results. He expressly limits it to cases where a satisfactory diagnosis cannot be made without it. As precautions he recommends (1) perfect asepsis, (2) immobility of the syringe and needle, and (3) resistance of the temptation to burrow about in the tissues with the needle. He proceeds as follows: The mass to be punctured is located by the middle finger of the left hand in the rectum and the index finger in the vagina, the rectal finger, if possible, reaching to the upper limits of the mass, the vaginal finger being applied to its lower pole. By conjoined palpation the point on the anterior abdominal wall directly over the centre of the swelling is located, and the needle is carried into the mass; the piston is then withdrawn by an assistant.

Loebinger¹ proposes, for diagnosis, an instrument which he calls the pelveoscope, three-eighths of an inch wide, including its covering, the width of lumen five-eighths of an inch; one and one-half inches from the round point a window, with a regulator,

is attached, behind which is an incandescent lamp protected by a small glass globe. The power is equal to about 1-candle light, and has a current of 5 volts. In order to obtain the effect of trans-lumination in the vagina, the speculum, preferably tube-shaped, is introduced and directed to the posterior wall. Examination takes place in a dark room. The anterior pelvis, with its thin walls, in this way becomes easily transparent; the ligaments of the uterus, pelvis, Fallopian tubes, and ovaries will shimmer through in a reddish-tinted glow. In an



enlarged or retroflexed uterus its walls will appear black, as will likewise fibrous or septic tumors of the pelvic organs, as well as abscesses and hæmatoceles.

Medical Treatment. — Both patient and physician, in the majority of cases, will desire to exhaust every means to relieve pelvic symptoms before operation is resorted to, and it is only in those

cases in which it is evident, from physical signs, that medical means would be inefficient and delay be dangerous that operation is considered. Rothrock¹⁷⁶ recommends for ovaritis 10 to 20 drops of extract dioscorea, alternating with bryonia in the same doses, to be given every one or two hours, and claims it to be a specific in such a condition. Bell²² urges that, as disease, both of the tubes and ovaries, develops as a result of some pre-existent affection of the uterus, the treatment should be first directed to the relief of the condition causing the disease; hence, he treats the patient by curetting the uterus, local applications to its mucous membrane, use of tampon, correction of displacements, with the exercise of complete physical and sexual rest. The bowels are carefully regulated, nourishment secured; in some cases uterine massage practiced, and ichthyl given internally. Albertoletti² states that after the use of ichthyl resolution takes place rapidly. In endometritis, which has proved refractory to the most active treatment, it has the advantage that, whilst at least equally efficacious with other remedies, it is perfectly borne in all cases, and can be used when other forms of medication are inadmissible.

Electrical Treatment. — Gautier⁷²⁰ advises, in non-encysted suppurative salpingo-ovaritis, the employment of the negative intra-uterine galvanic current in small doses,—20 to 80 milliam-pères,—because of its double action of denutrition and absorption. The procedure favors the flow of pus into the uterine cavity, rapidly diminishes the congestion of the adnexa, and relieves pain; but it may do harm if the tube is not permeable, permitting the pus to flow, and is also painful if there is any acute inflammation in the neighborhood. Chronic catarrhal and suppurating salpingitis demand negative galvanism in the following conditions: (1) when the tubes are permeable, allowing the pus to flow into the uterus; (2) if the patient has no acute attack of pelvic peritonitis; (3) if the tolerance of the current is good, and if such current is progressively increased. The flow of pus, which sometimes comes on during the first treatment and even at the third, is followed by immediate relief; but, when the pains continue, the general health grows worse, digestive troubles become exaggerated, and the patient complains of acute pains and nausea after each *séance*, we have grounds for suspecting purulent collection; the electric intolerance makes the diagnosis clear. Goelet⁴³ urges the

use of electricity in cases of salpingitis, claiming that it permits drainage of the uterus, and, through the setting free of oxygen, has a decidedly antiseptic effect, and that the failure to secure good results in the majority of cases is due to the ignorance of the operators, rather than the inefficiency of the agency employed.

Noeggerath^{201,202} advocates the use of electricity in the treatment of ovarian cysts, and reports a number of small-sized cysts that disappeared under such treatment. His method of procedure is as follows: 1. The character of the employed secondary current is for quantity, not for high tension. The induced wire should not be fine, as is implied by Tripier and Apostoli in the treatment of neuralgia of the sexual organs. 2. The negative pole, in the form of a moistened, firmly-held sponge-electrode in the vagina, introduced in the neighborhood of the lower section of the tumor; the positive pole, the size of the hand, over the bowel at the projecting point of the cyst. The current is made as strong as can be borne, should be continued for from fifteen minutes to an hour, and applied three times a week, over a period of six or eight weeks, when the tumor is markedly diminished.

Surgical Treatment.—Noble²⁰² considers the presence of a marked tubal disease, or a collection of pus in the pelvis, as a positive indication for the performance of an operation, but the existence of disease upon one side should not be considered an absolute indication for the removal of both organs. Rizkallah²¹⁷ presents the following conclusions upon the treatment of salpingitis: 1. The treatment must differ in accordance with the variety of the disease. 2. Salpingectomy is not the only remedy; this operation is indicated in cases of undoubted old pyosalpinx, large hæmatosalpinx, and tubercular salpingitis, as soon as these conditions are diagnosticated. 3. In cases of catarrhal salpingitis, salpingectomy is an unnecessary mutilation. 4. In those cases the uterus should be curetted and injected with iodine, after the method of Pozzi. In all fresh cases of pyosalpinx and slight cases of hæmatosalpinx this method is to be given a trial. 5. If the catarrhal form is associated with intolerable pain, due to cystic degeneration or pathological fixation of the ovaries, laparotomy must be considered. Polk¹⁰¹ would do exploratory incision in every case of disease of the tubes which had resisted non-operative treatment for a reasonable length of time, and in which the symptoms were such

as would threaten the life of the patient or make her a chronic invalid. Making the incision, he divided the cases into seven classes: (a) cases in which the tubes were operated upon, without amputation, to make them patent; (b) cases in which the infundibulum or ampulla was amputated, the ovary remaining; (c) in which the tubes and ovaries were simply freed from adhesions; (d) in which the ovaries were enlarged from continued congestion, due to displacement, and were not removed; (e) those cases in which the exploratory measures were applied to the ovaries; (f) those cases in which the ovaries were affected with 1, 2, or even 3 cysts, in which the cases were treated by enucleation of the cysts; (g) cases of amputation of the appendages, and bearing upon the problem of conservatism. He offers the following conclusions: 1. In cases of chronic disease of the appendages, incision should be in the nature of exploratory incisions. 2. The question of removal should, in the main, be left for determination after the organs are exposed. 3. The condition of the ovary should be the main determining factor in the question of procedure. 4. If need be, this might be determined by exploratory incision of the ovary. 5. If the ovary contains pus, it and the tube should be removed as in the classic Tait operation. 6. If the ovary be free from pus or the disseminated cystic degeneration, the operator should recommend either the last-mentioned operation or the partial amputation of the tube, leaving the ovary; this same rule applies to cases of hydrosalpinx and haematosalpinx, and preserves to the patient ovulation. 7. Cysts of the ovary do not demand removal of the ovary, provided they are not generally diseased, and the cysts should be enucleated; haematocele of the ovary is a possible exception. 8. Ovaries enlarged in congestion, as in displacements, need not be removed. 9. Tubes of the opened infundibula, even if adherent, parenchymatous, and affected with endosalpingitis, do not demand removal, except when opening into a pus-cavity. 10. A tube whose infundibula are closed may be opened and closed, its inner and outer coats coaptated and sutured, providing it does not contain pus and possibly old blood. 11. Adhesions do not warrant the removal of the tubes and ovaries unless they be so dense that breaking off the appendages would result in serious injury.

Duncan ² says that section should be done: 1. When a

definite tumor is found in the pelvis of the woman who complains of pain and, perhaps, haemorrhage. 2. If the tumor be a dilated tube, as even a hydrosalpinx may cause peritonitis. 3. Where the tubes are thickened by chronic salpingitis, with the ovaries enlarged and prolapsed, and after the course of tonics, aperients, and hot douches for two months are without avail. 4. If, after one or more attacks of pelvic inflammation, the patient suffers pelvic pain, dysmenorrhœa, or dyspareunia, and perhaps menorrhagia, while careful examination shows the ovaries and tubes matted together and the surrounding structures and the immobility of the uterus impaired, nothing short of abdominal section will cure, and, while the operation is an extremely difficult one, the ultimate result is correspondingly satisfactory. 5. In cases of ill-developed ovaries with an acute anteflexed uterus, associated with marked dysmenorrhœa and sterility, first, under anaesthesia, widely dilate the cervical canal by means of Hegar's dilators; these failing, as a last resource, remove the diseased ovaries. 6. Nerve pain; opening the abdomen the operator finds the ovaries and tubes fixed by adhesions, which should be broken down and the appendages brought into view, and careful examination made for any well-marked lesions; if sound, they should not be removed. In many cases the distress is due to the presence of adhesions. 7. Local interference in neurotic cases of ovarian neuralgia without ovarian disease is not only unnecessary, but absolutely unjustifiable.

Summers⁵⁶⁸ lays down the following rules: Never operate upon a practically moribund patient whose disease is chronic. The same rule applies to all acute diseases or injuries where haemorrhage is the depressing or suspectedly depressing cause. Never hesitate to operate upon otherwise hopeless cases if experience has demonstrated perfect cures to have followed even a very small percentage. Make use of the principles of modern antiseptic surgery before opening the abdomen, those of aseptic surgery afterward. Drain only after irrigation; evacuate the tube frequently, and remove it early. Give no nourishment by the mouth for twenty-four hours, allowing hot water, in small quantities, to allay thirst. Peritonitis should be treated with large doses of calomel and copious turpentine enemata. Use whatever technique is simplest and easiest, thereby diminishing shock and avoiding possible infection.

Tait²⁸ divides these cases of removal of appendages into three

classes, viz., those in which the operation is done for disease or symptoms which are uterine, such as myoma, otherwise incurable metastasis and incurable dysmenorrhœa; for change in the uterine appendages due to inflammatory diseases; for conditions and symptoms of a nervous character, mainly in connection with the menstrual period, which it is hoped to relieve or cure by the arrest of menstruation. Of the first class he lost 6, or 2 per cent., out of 271; of the 265 recoveries, 8 were unsatisfactory. The second group presents the most difficult cases of surgery; he has had urinary and faecal fistula remaining for months, suppurating sinuses remaining in 5 per cent., and continuing until treated by what he calls "circular drainage." He has done but few of the third group, but believes there are many cases capable of being relieved.

Chrobak,⁸⁴ believes that laparotomy is indicated in ovarian tumors as soon as they are recognized. Inflammation of ovarian tumor, if the same is localized, is the pressing indication. The same is true of twisting of the pedicle. In malignant tumors, the difficulty of diagnosis is the first consideration next to the recognized indications, as, in the climacteric, double side-tumor, hard and nodular condition, rapid growth, premature appearance of the growth, swelling of glands, œdema, ascites.

Rendu lays special stress on the relation of the vaginal roof to the lower pole of the tumor. In several cases the vaginal floor and all its layers were found adherent to the lower pole of the tumor. If abscess formations can be excluded, this is a quite significant indication for malignancy. In abdominal section, the first question is as to adhesions; a probe incision, if proper precaution be observed, may be made without difficulty or danger in myomas. The indications for the operation are the rapid growth of the tumor and haemorrhage not easily arrested. The non-malignancy of tumors is not always to be relied on.

Rosenwasser²³ discusses the technique of intra-ligamentary operations, and advises that the cyst-pocket, together with the abdominal cavity, be thoroughly washed out with hot water, the abdomen closed, and the cavity drained with a rubber tube. In removal of a pelvic haematoma, Emmet accidentally incised the sigmoid flexure for two inches; the patient recovered with a faecal fistula, which afterward closed. Rosenwasser advises, instead of attempting to remove the haematoma, that it should be incised, its

contents removed, and the cavity packed with gauze. Where possible, the walls should be stitched up and the edge of the parietal incision brought up to the posterior wall of the uterus by suturing to the abdominal wall through the sac, through the peritoneal coat of the uterus, and, finally, through the opposite edge of the sac and abdominal wall. This not only obviates dangerous dragging upon the sac, but acts as a patch that fills up the gap between the level of the parietal incision and the edge of the sac. Traction on the friable edges of the sac of the haematoma can be greatly diminished during the operation by manual support, and subsequently by tamponing the vagina.

Ferguson reports the removal of a large peritoneal polycystic tumor by abdominal section, without opening into the peritoneal cavity. The cyst was emptied of 6 gallons (24 litres) of fluid and peeled out.

Buchanan² had a patient on whom ovariotomy was done three times. It is supposed the first cyst was parovarian, and the ligatures applied outside the substance of the ovary. The second cyst was decidedly the ovary, either the one not formerly involved or the other from which the unilocular cyst had proceeded. The third cyst was multilocular. Doran³ questions the theory advanced by Buchanan, and says it was most probable that the tumor removed at the third operation arose in some minute secondary cyst left in the stump of the pedicle after the second ovariotomy. Miller and Pozzi have observed that cystic tumors may develop in a piece of normal ovary left behind after the amputation of the appendages for the relief of fibroid disease of the uterus. Pozzi⁴ says that, where the ovary is diseased in part, only partial operation of the gland is preferable to its entire removal, from the point of ulterior fecundation. It is to be borne in mind that any fragment of an ovary is capable of evolving an ovule; therefore, resection of the gland should only be practiced in cases where the Fallopian tube is found to be permeable.

Grandin⁵ reprobates abdominal section for adhesions or peritonitis associated with disease of the tube, saying that we operate chiefly because there is pus, which, if not removed, may, by losing its localization, endanger still more the patient's life. In laparotomy an adherent tube is literally dug up from the *cul-de-sac*, its pedicle ligated, and the tube removed. The woman is without

a pus-tube, but has new peritoneal adhesions, which frequently bind the uterus and intestines and compress the pelvic nerves. It gives her no comfort, when she complains of the pain, to be informed that she has had a pus-tube removed. He recommends, in such cases, vaginal incision, and claims that it is not a dangerous procedure when performed antiseptically. The uterus and uterine arteries may, with care, be avoided. Under irrigation with 1-to-6000 bichloride solution, he aspirates the tube *per vaginam*, avoiding the urethral triangle, passing directly along the aspirator-needle, and, with it as a guide, by a slender bistoury an incision is made. This incision is dilated or enlarged by the uterine steel-brass dilator. The finger may then be inserted into the cavity and its interior thoroughly explored, for the purpose of breaking down pus-cavities within. Occasionally it may be desirable to curette the cavity. A small hard-rubber tube is inserted into the cavity, and the latter washed out with boiled water containing bichloride or carbolic acid, according to preference. Then fully a pint ($\frac{1}{2}$ litre) of peroxide of hydrogen is allowed to flow into the cavity. This is the essential step by means of which the pyogenic membrane is destroyed and pus is checked. When satisfied that the process of destruction of the membrane is complete, a gauze drain is placed in the bottom of the cavity, and in a few days all that remains of the abscess is the shriveled tube, surrounded by more or less exudation, which ends, of course, surgical treatment *per vaginam*.

Playfair², discusses the removal of the uterine appendages (1) for a case of neuroses, which was without benefit, subsequently cured by systematic treatment; (2) for a similar case, in which the operation was recommended, the patient refused consent, and was likewise cured by systematic treatment; (3) for a case of neuroses in which there was definite evidence of destructive disease of the appendages; (4) for a case of hystero-epilepsy and mania. He concludes that the removal of the appendages is not a legitimate procedure in cases of purely functional neuroses; that when marked structural disease of the appendages co-exists with severe neurotic disease, the latter should first be treated, in the hope that operation might be avoided; that in hystero-epilepsy and hystero-mania the result has been so unsatisfactory that it is considered a procedure of very doubtful expediency, and not to be

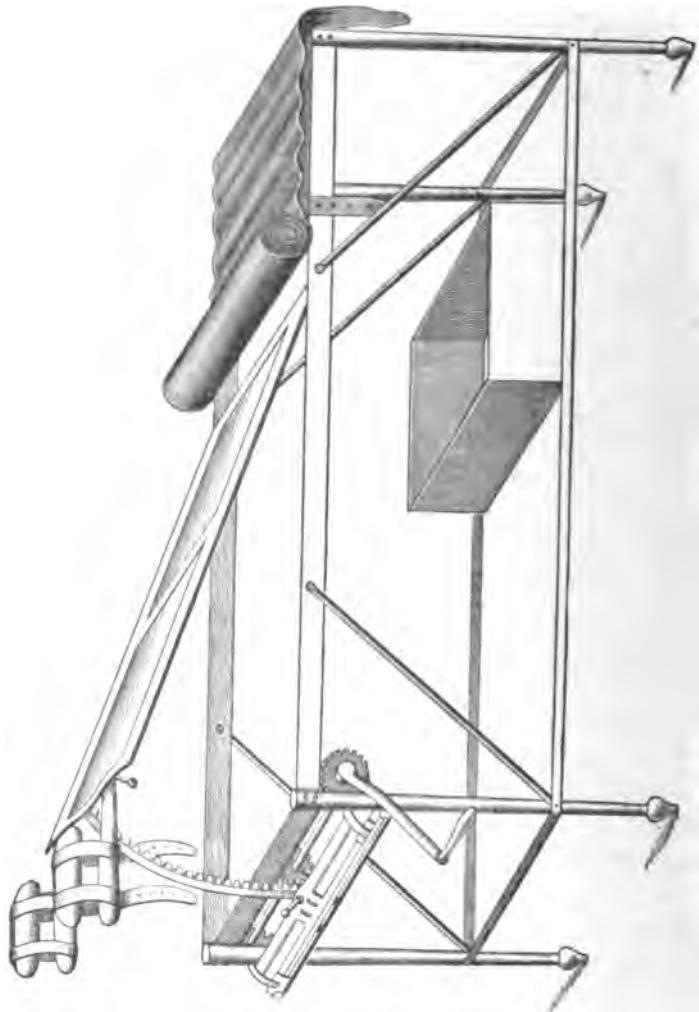
recommended. Lusk⁹⁹ asserts that the performance of normal ovariotomy for epilepsy and insanity is to be regarded as hardly better than malpractice. A review of the results of Tait's operations shows that, as a rule, the change of life is effected without unusual disturbance and without loss of womanly instincts, and that the sexual appetite in many cases persists. On the other hand, in certain cases, fistula, hernia, adhesions, local inflammations, and a variety of physical changes complicate the issue. In some instances the relief is immediate, in many it is long delayed, and in a few it never comes at all. "I do not hesitate to confess," says Lusk, "that in cases of enlarged and tender tubes I resort to rest, the vaginal tampon, douches, massage, faradism, and a tonic regimen. If the tubal swelling is intermittent and associated with a narrow cervical canal, I am not afraid to use Goodell's dilator to secure free drainage of the uterine cavity. If the damping up of the tubes is the result of adhesions, I try to drag them up according to Schultze's method, provided the tube-sacs do not contain pus."

Cotterell¹⁰⁰ reports a case of the removal of the appendages for relief of mental disease, in which the mental symptoms were aggravated immediately after the operation; but, although the patient had suffered from suicidal mania and hallucinations, she has not had, for three years, any of these symptoms, and has every reason to believe that she is now entirely cured.

Technique.—Hirsh¹⁰¹ suggests the following method for securing a clean operating-room. The ceiling and walls should be swept free of dust, all wood-work wiped with dampened cloths, a boiler of water kept steaming in the room to settle the atmosphere, and, when ready for the operation, clean bed-sheets should be tacked over the carpets.

Jacobs¹⁰² says that he has abandoned all antiseptics, such as sublimate, iodoform, and the antiseptic gauzes, and uses no antiseptics, except in the washing of the hands. He does not use sponges, but pieces of gauze sterilized by boiling and afterward by heating; uses a table on which the patient is placed on an inclined plane, which has the advantage of affording an increased opportunity for observing the contents of the pelvis, while the patient is less likely to suffer from the administration of the anæsthetic. (See cut, page 30.)

Leopold¹³² advocates the use of an operation-table on which the patient is kept on an inclined plane, the lower portion of the body being elevated. Its advantages are, that the intestines fall, anatomically, toward the diaphragm, the pelvis being free. No

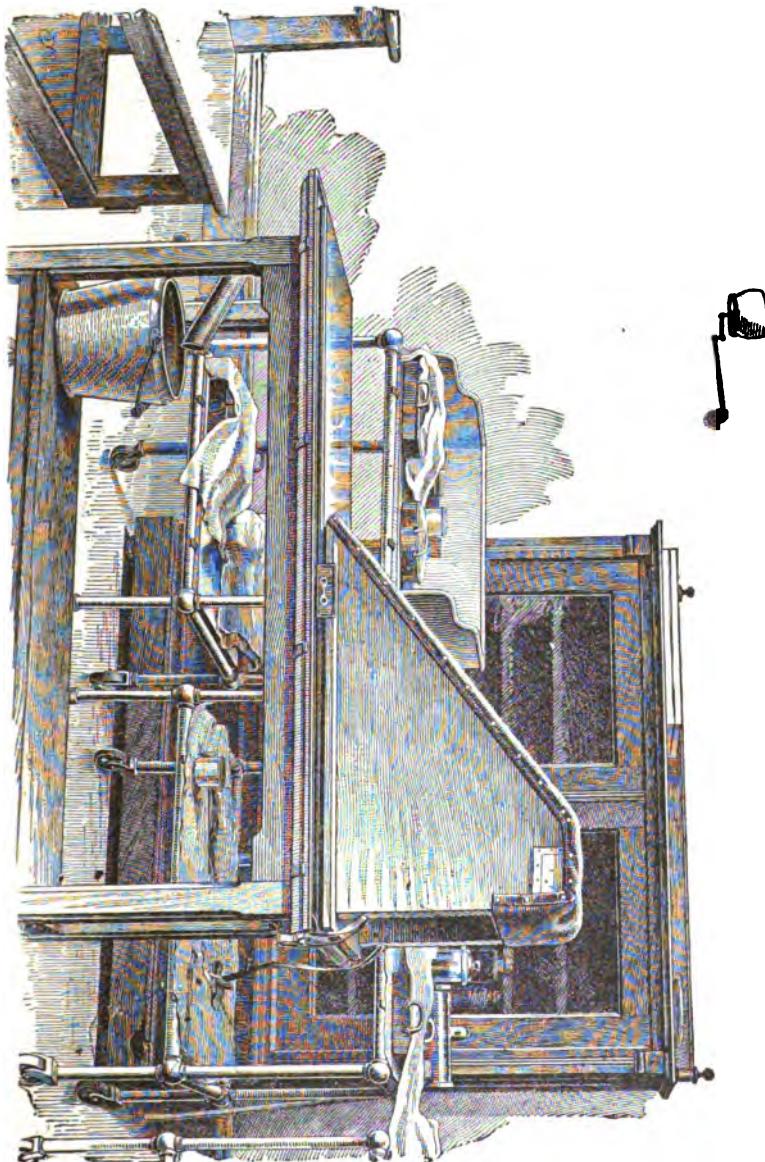


JACOB'S LAPAROTOMY TABLE.
(Archives de Gynécologie.)

troublesome prolapse of the gut can occur through the abdominal wound. During imperfect narcosis, a large flap is placed over the intestines to guard them, and thus evanescence of some coils of gut, in order to explore puzzling conditions of the pelvis, becomes needless. The pelvic organs can be seen with ease, the sacrum coming

into view. The sewing up of the large peritoneal wound, after the removal of the uterine fibroid, can be managed with ease, by-standers

(From, American Assoc. Obstetricians and Gynecologists.)



being able to see the entire area of operation. As the operator can get so deep a view of the pelvis, there is no fear of clots and pools of pus and sanies being left behind. The ureters, and

other structures passing over the brim of the pelvis, can be seen. The position known as Trendelenburg's was first recommended by that surgeon in supra-pubic cystotomy. Its use has also been



FIG. 2.—Krug's LAPAROTOMY-TABLE.
(Trans. American Assoc. Obstetricians and Gynecologists.)

urged by Krug,²⁰²¹ whose sketches of the table, and the patient lying upon it for operation, are given (pp. 31-33). In addition to the advantages enumerated by Leopold, Krug states that a single

flat sponge will keep the intestines out of view during the whole operation. All unnecessary handling of them, particularly even-tration, which surgeons have sometimes found necessary when



FIG. 8.—KRG'S LAPAROTOMY TABLE.
(Trans. American Assoc. Obstetricians and Gynecologists.)

operating in the horizontal position, is thus strictly avoided. The main advantage, however, is, that the operator can see everything he is doing, the entire pelvis being before him. Every bleeding

point is at once detected, and easily tied. The procedure is without disadvantages; it does not interfere with anaesthesia, no matter whether chloroform or ether is administered; on the other hand, shock, due to sudden anaemia of the brain, is less liable to occur.

It has been objected that pus from a ruptured ovarian abscess or pyosalpinx may flow all over the intestines and contaminate the entire peritoneal cavity. The fact is, however, that there is less liability of rupture of an intra-peritoneal pus-cavity, since the operator is not groping in the dark, but sees what he is doing, and can, in most instances, avoid this accident in part. Another objection is, that a larger incision is required; but the larger opening is not necessarily objectionable, ventral hernia being as liable to occur in a two-inch as in a four-inch incision, if the wound is

not properly closed. The practice of making a very small incision with the patient in a horizontal position cannot be too strongly condemned, in view of the danger it engenders. Through the small opening the operator digs up a mass,—tube and ovary,—ligates the pedicle without being certain that he is entirely controlling the bleeding;

without being able to determine from whence the bleeding comes, or whether a portion of infectious material has been left behind; and being obliged to depend upon the washing out of the cavity for the removal of any such infectious material. The posture is indicated especially in cases of removal of diseased tubes and ovaries, particularly where they are the seat of purulent disease and are bound down in the pelvis by firm adhesions; in ruptured ectopic gestation, the bleeding-point being discovered at once and readily tied, without the often troublesome interference of the small intestine, as will generally be the case if the patient is in the horizontal position. When operating in profound shock, due to intra-peritoneal loss of blood, the posture is of especial advantage, preventing sudden collapse and acute anaemia of the brain. The angle at which the body is placed should not be less than 45 degrees. Figs. 2 and 3 represent portable apparatus for the opera-

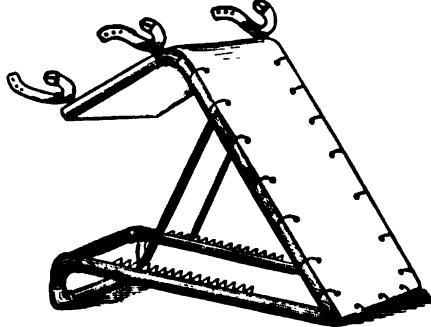


FIG. 4.—SIMPLE APPARATUS FOR LAPAROTOMY.

tion. Fig. 4 shows a simple apparatus which answers the purpose in every respect. It consists of two galvanized iron frames, the lower one of which can be fastened to a laundry-table, as well as to any operating-table, either by screws or carpenters' clamps. After the abdominal incision the upper frame is jointed to the lower one, and is covered with heavy sail-canvas, on which straps are provided for the knees and ankles of the patient. The upper frame is placed at any desired angle, and held there by supporters, as shown in the cut. The apparatus has the following advantages: First, the galvanized frame is easily kept clean and aseptic, while the canvas can be readily sterilized by steaming or boiling; second, the apparatus can be readily transported, thus facilitating its use in the patient's house; third, compared with other apparatus especially devised for this purpose, its price is a very moderate one, and places it within the reach of all.

Delagénière⁷³ also operates upon some cases of abdominal section with the patient upon an inclined plane. He constructs a

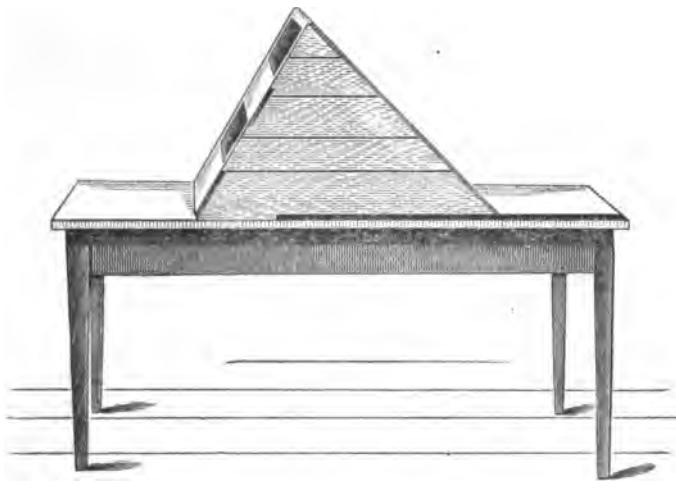


FIG. 1.—DELAGÉNIÈRE'S LAPAROTOMY-TABLE.
(*Le Progrès Médical.*)

sort of a desk of wood, of a breadth of 45 centimetres, which gives an inclined plane forming with the horizon an angle of 45 degrees. This desk is placed upon an ordinary table, upon which we may strap the patient flat, and abolish the inclined plane, if necessary. The table has a width of 50 centimetres and a height of 72 centimetres. The desk rests upon one or the other of its sides,

though their length is made unequal, in order to adapt them to different heights, one measuring 80 centimetres, the other 85 centimetres. The legs of the patient are pendent from the sides of the desk, and are fixed by a napkin. Thighs and pelvis are in the inclined plane, while the head and neck rest upon a pillow placed on the table, as in Fig. 2. The head is turned toward the window so that the light illuminates the abdomen, the adhesions being readily seen and separated.



FIG. 2.—DELAGÉNIÈRE'S LAPAROTOMY-TABLE.
(*Le Progrès Médical.*)

Ashton,⁹ says it is his custom to thoroughly salt his patients. He gives a tablespoonful of sulphate of magnesia every hour, until six free movements of the bowels are produced; if the stomach is irritable, the dose is reduced to a teaspoonful every half-hour. About six hours before the operation he gives an enema of a tablespoonful in a pint of warm water. No one can die of sepsis except when pus or faecal extravasations have entered the abdominal cavity through neglect of the operator. He uses drainage less and less, but always employs it in pus cases. If the abscess contents have escaped into the abdominal cavity, he repeats the use of the salts in twenty-four hours after section, if the stomach is quiet. Where the patient is unable to bear the salts, he employs calomel,

in $\frac{1}{4}$ -grain (0.016 gramme) doses every half-hour. The early evacuation decreases the tendency to adhesions between the loops of intestines or between the gut and pedicle-stump. All patients make a more rapid recovery if the bowels are emptied early. A week after the operation he permits his patients to assume a half-sitting position.

Drainage and Irrigation.—Duncan², never uses a drainage-tube; in simple cases, where numerous adhesions have been torn

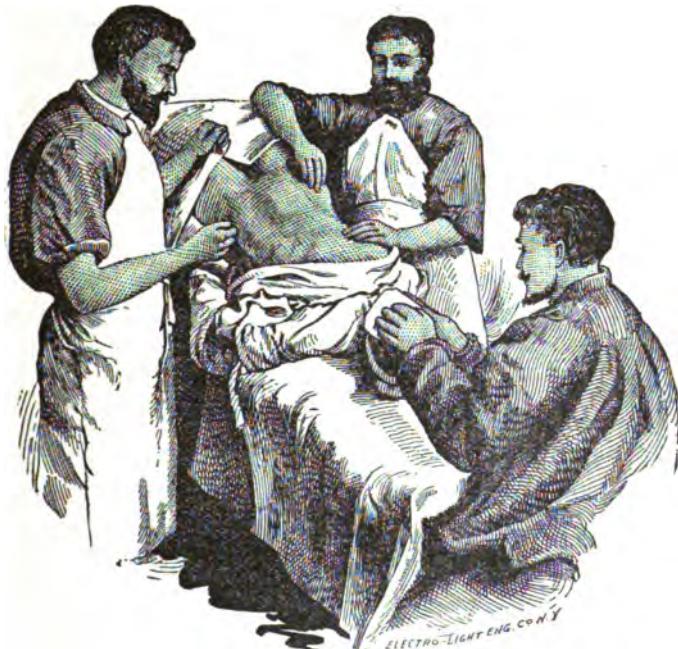


FIG. 8.—DELAGÉNIÈRE'S LAPAROTOMY-TABLE.
(*Le Progrès Médical.*)

through, causing oozing of blood, or where some of the contents of the tumor have escaped into the abdomen, he uses a glass tube from thirty-six to forty-eight hours. Flushing the abdominal cavity, while a proceeding attended with risk, is useful where pus or other irritating fluids escape into the tube. He always uses a 5-per-cent. boracic-acid solution, at a temperature of 100° F. (37.8° C.), introduced by a large rubber tube attached to a douche-tin. Sänger¹, prefers to drain by means of a tube containing absorbent material, used for three or four days. An intra-abdominal gauze tampon has the same inconvenience as simple capillary

drainage, in that the gauze becomes saturated and the exudate within the abdomen does not find a ready exit. If there is fear of haemorrhage from accident to the ligatures, combined drainage should be used; that is, with the tube surrounded by gauze. Indications for the intra-abdominal tampon are as follow: 1. Circumscribed foci of decomposing blood, or blood which is liable to decompose, and foci of secretions, the evil of which, both locally and generally, cannot be overcome by the absorbing power of the peritoneum. 2. The possibility of the secondary accumulation of secretions, which, under decomposition, may cause septic intoxication. 3. Existence of danger of rupture of injured organs, and leakage of their contents into the abdominal cavity; this refers specially to the bowels and bladder. 4. The presence of extensive bleeding surfaces from which there may be considerable exudation.

Morris ⁸⁰ recommends for drainage a roll of wick or bichloride gauze, wrapped in a couple of thicknesses of Lister's protective oiled-silk, the wick protruding a trifle from each end of the cylinder, and a few holes in the protective, allowing the serum to reach the gauze. Where injections through a tube are desirable, the soft-rubber tube can be surrounded by this wick. When a large gauze packing for the pelvis is needed, an apron of silk can project over it, protecting it from adhesion to the intestines; the wick acts by capillary attraction. The silk wrap will not irritate the peritoneum, and the whole thing is so soft that it readily adapts itself to the curves. He doubts if it would cause faecal fistula. The end of the wick, which projects at the external opening of the wound, should be covered with enough absorbing material to hold all fluid that comes from below. A row of these wicks, introduced into a panful of water, will empty the pan in a few moments by siphon action, and they would empty it almost as quickly if each led up to the bunch of absorbent cotton or gauze. A little wick, as thick as a lead-pencil, will take pints of fluid out of the abdominal cavity and transfer it to an absorbent medium outside. When the wick is at work, it is important for the patient to lie upon her back; for, if the intestines are not inflated with gas, the fluid rises naturally to the anterior abdominal wall, instead of settling, as many surgeons suppose, in the region of Douglas's pouch; hence, if the patient lies upon her side, the fluid is out of reach of the drain.

Sutures and Ligatures.—Wathen⁶¹,_{Aug.} recommends the following method of sterilizing silk: he takes the Chinese hard-twisted silk, which is purchased in unbroken packages and wound loosely on separate glass spools; these are put into glass test-tubes, which are stoppered with absorbent cotton and then sterilized. They are kept in a sterilizer for an hour, for three consecutive days; the silk is now so free from bacteria that a culture could not be made from it, and, if the cotton is not removed, it will remain in this condition. Each tube contains enough silk for a laparotomy. Silk and needles are kept, during the operation, in sterilized water, at a temperature of 212° F. (100° C.), in which he also keeps the small drainage- and large irrigation- tubes.

Russell,³⁹,_{Jan. 16} writing of the silk ligature, asks the following questions: 1. Did the ligature drop away in an avenue of pus, after its term of usefulness had expired, in the same way as a ligature used in the deligation of the artery finds its way to the surface? 2. If so, what becomes of the pus imprisoned and the ligatures so liberated in the abdomen? 3. Did the ligature remain *in situ*, entailing months or years of indefinable discomfort, such as always attends the presence of a foreign body within the tissues or matter in a wrong place? 4. Did the ligature and its attendant products of pus and other disintegrated matter undergo solution, digestion, and absorption into the system? 5. If so, the pabulum would seem to be most unsuitable, and, even if suitable, what becomes of the effete residuum which is attendant upon all processes of digestion? 6. Did it also enter the circulation in a state of decomposition, but of non-assimilation; and was it carried in the blood-current until it became deposited in some nook of the lung, or liver, or kidney, and set up business on its own account, continuing to disseminate and propagate among the surrounding tissues? He reported a case of ovariotomy in 1883, where the tumor was removed and the stump cauterized and dropped back. The right ovary was found healthy, but was removed, the pedicle being ligated by a double silk ligature. Five years later the patient complained of swelling in the right foot and leg; following this, there was indication of an abscess communicating with the liver. Upon examination after death, careful attention was given to the contents of the pelvis; the pedicle on the left side, which had been cauterized, presented no marked signs of thickening; around it, on the other

end, especially where the pedicle was incorporated with the parts, were dense fibroid adhesions, in front of the sacrum and adjoining pelvis. On the uterine side, at what appeared like the seat of ligatures, there was a four-chambered cyst, about the size of a small walnut, which contained purulent material. Behind the uterus and around the rectum, fibroid induration and thickening, extending to and involving the walls of the rectum. This condition extended upward and entered the connective tissue along the spine, the ureters being both imbedded, the left so surrounded by this new tissue as to cause its complete blocking; the left kidney was in a state of hydronephrosis; the liver contained small nodules, which were cancerous. Examination indicated that the ligatures on the right side were the source of irritation.

Complications.—Jewett¹⁵⁷ says that peritoneal adhesions are due to sepsis; foreign bodies, ligatures, etc., if not infected, never give rise to inflammatory processes, on which adhesions depend. Prevention, therefore, depends upon complete asepsis. Failure of absolute sterilization must frequently occur in the case of the operator's hands, and, possibly, through the air of the operating-room.

Kelterborn⁸¹⁷ claims, from the result of 18 experiments on cats, dogs, and rabbits, that losses of the epithelium and eschars of the peritoneum do not lead, in uncomplicated cases, to the production of adhesions. Ligatures in the abdominal cavity rarely produce adhesions, but usually become encapsulated; by far the most common cause of adhesions, after laparotomy, is infection; there is, therefore, no objection to the free use of the thermo-cautery in separating adhesions.

Duncan²¹¹ states that vomiting is the most common complication. This and the ordinary sickness from the anæsthetic are best treated by fasting for twenty-four hours. Recently, he has adopted a plan suggested by Howse; it is to administer, per rectum, at the completion of the operation, an ounce of port wine with an equal quantity of hot water; in severe vomiting, with flatulence, a dose of sulphate of magnesia or soda. Flatulence is relieved by a soft India-rubber tube passed into the rectum, and by avoiding ice. In the development of peritonitis, the best chances are given the patient by reopening the wound without delay, washing out the cavity with boracic-acid solution, and inserting a drainage-tube.

Bernays⁸² divides the complications which arise during opera-

tions on the abdominal viscera into two classes : 1. Accidental or necessary lacerations and lesions of (a) the alimentary tract ; (b) the urinary organs and passages ; (c) the biliary ducts and vessels. 2. Accidental or unavoidable rupture of abscess, or of degenerated neoplasms, with escape of contents into the peritoneal cavity. The first class of cases must be treated according to conditions present : in some, fastening the displaced organs so that the discharges take place externally ; in others, suturing the opening, and, by drainage, making sure that the union of the surfaces is secured. In the second class flushing the abdominal cavity with either antiseptic or aseptic fluids should be avoided ; dry or nearly dry sponges should be used, with pieces of gauze for wiping, cleansing, or sponging away undesirable material that may have escaped into the cavity or upon the edges of the wound ; the procedure called the toilet of the abdominal cavity should be abandoned, as it does more harm than good ; all prolapse of the intestines by the Trendelenburg method of elevating the pelvis should be avoided ; the introduction of sponges, fingers, instruments, etc., into the cavity, restricted to the utmost degree of necessity. As to the question of drainage, a precise rule of action cannot be given, but its restriction is recommended as much as possible, on account of the discharges of secondary or late infection, which are always associated with abdominal drainage, even with good nurses.

Frank² _{Sept. Oct. 10} describes 2 cases of malignant disease of the abdominal cicatrice after ovariectomy. The first case developed a year and a quarter after the removal of a papillomatous cyst ; it grew gradually until it reached the umbilicus, and at the time of operation occupied the entire hypogastric region. It appeared to be an adeno-carcinoma of the ovary. The second case was a glandular cystoma ; removed on March 18, 1891. The patient had a tumor the size of a man's hand, proceeding from the cicatrix, which proved to be an adeno-carcinoma. Frank believes that both these tumors arose from cells which belonged to the original cyst, and were left behind in the abdominal cavity. For that reason every endeavor should be made to prevent the escape of cystic fluid through the peritoneum in the course of the operation.

Closing the Wound.—Pryor¹⁰¹ suggests that, in closing the wound of a very fat person, and where drainage is necessary, the peritoneum be first closed by Czerny-Lambert sutures of catgut,

and the fascial and muscular lines with sutures of silk. Where the abdomen is very fat, he packs the external wound with sublimate-gauze, and allows it to fill up by granulation. This method of treatment, he says, renders a secure cicatrix, which is not likely subsequently to form a hernia.

Truss.—An apparatus, ¹ to be worn after the operation of laparotomy, for the purpose of strengthening and sustaining a cicatrix and preventing the ventral hernia which is apt to follow that operation, consists of a hard-rubber disk, five and one-half inches by two and seven-eighths inches, held in place by an elastic band passing around the body and bands which encircle each thigh.



TRUSS TO BE WORN AFTER LAPA-
ROTOMY.
(*New York Medical Journal.*)

These bands are fastened to brass pivots attached to the front surface of the pad, and admit of any motion of the body without displacement of the pad. The pad is concave on its inner surface, and closely approximates the contour of the abdomen. The beneficial effects obtained by the use of this pad, after severe cases of laparotomy, seem to warrant its presentation to the profession.

Results.—Krukenber ^{817 213} _{1886, Oct.} investigated the effect of the removal of the ovaries on the ciliated epithelium of the genital tract. Bischoff

and others have established the fact that only the tubes have ciliated epithelium in childhood, the uterine mucosa from puberty onward; while after the climacteric (as Klob has shown) the cilia disappear. It was accordingly of interest to inquire whether the cilia perished in the premature menopause resulting from castration. The examination of a castrated woman can lead to no definite conclusion on the subject, seeing that ciliated cells would not, as a rule, be found in cases of endometritis, which almost always exists before the operation. Experiments were accordingly made on lower animals, in some of whom only the cervical epithelium is ciliated, while in others the uterine cornua are also ciliated. For about seven months after castration the uterus maintained its normal weight, and the ciliated epithelium

remained unchanged. After nine or ten months the uterus showed an appreciable loss of weight, while the cilia began to disappear from the uterus and from the tubes. The co-existing closure of the abdominal ends of the tubes, which always takes place at this time, may be taken into account in regard to the disappearance of the tubal cilia, but not that of the uterine cilia; besides, we see this last associated with the atrophy of the uterus, and we know, from the researches of Kehrer, that closure of the tubes does not lead to atrophy of the uterus. Castration accordingly acts on the uterus in the same way as the menopause,—the ciliated epithelium disappears, but only after the uterus has become atrophic. The ciliated epithelium does not form in an animal castrated very young.

Osteomalacia.—Hofmeier¹³² reports this disease in a virgin 30 years old. It had been in existence three years, and was progressive at the time the operation was done. The patient suffered from severe pain in the pelvic bones, inability to walk, and marked pelvic deformity. Four weeks after the removal of the ovaries she could walk without assistance, and the pains were much less severe. Hofmeier states that Fehling has collected 20 cases of castration for this disease, in none of which was there a failure on the part of the operator to secure at least a temporary relief.

EXTRA-UTERINE PREGNANCY.

Bland Sutton⁶ remarks that, although Fallopian tubes are found in connection with every uterus,—bicornuate or medium,—he regards it as a most significant fact that he has failed to find in literature any case of tubal gestation, except in the human family, that will bear criticism. It is usually taught that, in the human family, the tubes are the meeting-place of the ova and spermatozoa, but this is pure conjecture. Concerning the cause of tubal pregnancy, we are very ignorant. A careful analysis of the history of patients who are the victims of this accident throws but little light on the matter. The fact that the accident frequently follows long-continued sterility in a woman who has previously borne children gives rise to the conjecture that the condition is salpingitis, and the destruction of the proper ciliated epithelium will account for the occurrence of tubal gestation, inasmuch as it puts the mucous lining of the tubes in a condition exactly similar to that of the uterus. Tait claims that the uterus alone is the seat of normal

conception ; that as soon as the ovum is affected by the spermatozoa it adheres to the uterus ; that the function of the ciliated lining of the Fallopian tubes is to prevent spermatozoa from entering them, and facilitate the progress of the ovum into a proper nest ; further, that the plications and crypts of the mucous membrane lodge and retain the ovum either until it is impregnated, dies, or is discharged. This view Sutton holds to be speculation, and that, while it contains an element of truth, it does not explain all cases. In the first place, salpingitis, so severe as to produce destruction of the tubal epithelium, causes such profound changes in the tubes themselves as to lead to stricture and complete occlusion of the abdominal ostia. It is exceedingly rare to meet, in tubes denuded of their epithelium, the abdominal ostia patent. In several specimens of very early tubal pregnancy he has failed, even after the most careful microscopical examination, to find any evidence of old salpingitis or loss of epithelium. An impregnated ovum may be arrested in any part of the tube. In the early stages the ovum becomes quickly beset with chorionic villi, which enlarge, become vascular, and, if not interfered with, in due course form a placenta, but in a manner which somewhat differs from that of the uterine placenta. The events may be considered in the following order: (1) the changes in the tube and the mode of closure of the abdominal ostia ; (2) pathological changes affecting the ova ; (3) tubal abortion ; (4) rupture of the gestation sac, changes in the tube during the first month or six weeks. The portion of the tube containing the ovum becomes very vascular and somewhat thickened. This has been described as hypertrophy, but differs very greatly from the enlargement exhibited by a gravid uterus. The latter is due to an increase in size and number of the muscular cells, whereas in the gravid tube the increase in size is simply a turgescence.

In some, the walls of the tube in contact with the ovum seem to stretch and thin from the beginning of the gestation. The rapidity of thinning varies in different tubes, and this is doubtless due to the fact that in normal conditions the tubes vary not only in length but in thickness. In some individuals they scarcely exceed in thickness the vasa deferentia of the male, or resemble the narrow tubes of the mare or cow. As the tube expands from the ovum within it, the mucous membrane is stretched and its

glandular folds effaced. Occasionally a few of the plicæ project into the tube as long, straggling processes. At the same time curious alterations have taken place in the abdominal ostium, in most cases gradually bringing about its occlusion, an event usually completed by the eighth week. During the first four weeks the congestion of the parts causes turgescence of the fimbriated cells, the muscles, and serous tissues adjacent to them. When the parts are thus swollen, the margin of the peritoneum adjacent to the ostium is very conspicuous, and forms an irregular ring over the fimbria. In another fourteen days this ring projects beyond the fimbria, and at last contracts and hermetically closes the ostium.

The most important pathological change that may occur in the ovum after impregnation, which occurs in connection with its investing membrane, is the growth of cellular dendritic processes, which are known as chorionic villi. The villi, when thoroughly developed, cause the exterior of the ovum to present a shaggy appearance, and serve to fix it in the adjacent mucous membrane, whether uterine or tubal. They soon become permeated by vessels conveyed to them from the aorta of the embryo by the allantois. Those villi which do not become atrophied subsequently increase in size and complexity, and ultimately form the foetal portion of the placenta. The life of the ovum is precarious, whether the gestation be tubal or uterine, until the placenta is well formed, if the union between the ovum and mucous membrane is not intimate before this. The result is that, from a variety of causes, the ovum is dislodged, in part or entirely, from its relation to the mucous membrane. Such dislodgment is always accompanied with, and in many instances actually caused by, haemorrhages among the chorionic villi. Practitioners are familiar with the rounded bodies discharged from the uterus of pregnant women by profuse haemorrhage. These products are known by various names,—blighted ovum, fleshy or carious moles, apoplectic ovum, etc. When an apoplectic ovum is examined soon after its discharge, it resembles a firm blood-clot in color and consistency. On dividing it, a cavity containing fluid, sometimes straw-colored, sometimes stained red by mixture with blood, is found. The walls of this cavity are smooth and lined with amnion, and often a misshapen foetus or the stump of the umbilical cord is contained within. Frequently no trace of the embryo can be detected.

Fleshy moles, similar to those arising in the uterus, occurring in connection with tubal gestation, appear to be more common between the fourth and the fifth weeks than at any other period. Their formation is, in most cases, attended with disastrous consequences to the individual unfortunate enough to become the victim of tubal pregnancy. When extravasation of blood is extensive, and obliterates the amniotic cavity, it becomes doubtful whether we are dealing with a lump of blood, pregnancy, or an apoplectic ovum; for it must be borne in mind that the ovum of this character is retained for many days in the pelvis after its discharge from the tube, or, if it be lodged between the layers of the broad ligament for many weeks, becomes eliminated and hard. Under such conditions its nature can only be satisfactorily determined by finding an embryo or its remains imprisoned in the clot, or by ascertaining the existence of chorionic villi.

The formation of an apoplectic ovum in the tube is a frequent means of inducing tubal abortion or rupture. A specimen of this kind in St. Bartholomew's Hospital is described as haematooma of the broad ligament. Between the layers of the right broad ligament is a globular cyst, about as large as a walnut, the wall of which, in a recent state, seems to be formed by the separate layers of the ligament. Its cavity is filled with recent blood-coagulum. On the anterior of the cyst are two small, recent, irregular openings. A patient 25 years of age, under treatment in the hospital for warts on the vulva, was suddenly attacked with symptoms of internal haemorrhage, and died in twelve hours. Autopsy disclosed 5 pints of effused, coagulated blood in the peritoneal cavity. Dark, fluid blood oozed slowly from the openings. A careful examination of the blood-cyst failed to discover the source of the haemorrhage. There was no evidence of the existence of uterine pregnancy, and no ruptured vessel was detected. The histology showed clearly enough the supposed blood-clot to be really an apoplectic ovum, and the woman to be a victim of a tubal pregnancy, which was fatal about the fourth or fifth week. An apoplectic ovum may be identified as follows: (a) when recent, it resembles, in external appearance, a piece of blood-coagulum of a dark-red color. If it was free in the peritoneal cavity, or lodged between the layers of the broad ligament for several days or weeks, it will be of a yellowish color externally, and quite

firm and hard ; (b) large apoplectic ova are usually elliptical in shape, small ones more or less circular ; (c) the average size of such ova is that of a walnut ; (d) the presence of the central cavity lined with a smooth membrane—the amnion—the cavity may contain an embryo ; (e) sections of the clot will show, under the microscope, chorionic villi. It should be remembered that an impregnated ovum in the outer tube leads to occlusion in the abdominal ostium, which is completed by the end of the sixth week, sometimes delayed to the eighth. So long as this orifice remains open, the ovum is in constant jeopardy of being extruded through it into the peritoneal cavity, especially when it lies in the ampulla of the tube, and, the nearer it is situated in the ostium, the greater is the chance of its being discharged from the tube ; the accident is termed tubal abortion, from its resemblance to the early abortion occurring in extra-uterine gestation before the end of the second month. These cases of tubal abortion are worthy of attention, because specimens of Fallopian tubes have frequently been described in which blood-clot has been found hanging from their fringes. It is true that copious hæmorrhage into the peritoneal cavity, accompanied with the usual signs of internal bleeding and death, may occur from anæmia or from shock. Escaping this, the patient, in many cases, becomes a victim to peritonitis. Tubal abortion can only occur during the first month ; it is of interest, for the reason that it furnishes many cases of hæmatocoele, which are ascribed to metrorrhagia, reflex or menstrual blood from the uterus, and hæmorrhage of the mucous membrane from the Fallopian tube. The reason for associating the hæmorrhage with metrorrhagia and menstruation is, that whilst the ovum is growing in the tube a decidua is forming in the uterus. When tubal abortion occurs, hæmorrhage takes place from the uterus, consequent upon the separation and expulsion of the decidua.

With rare exceptions, the pregnant tube aborts or ruptures before the twelfth week following impregnation ; in abortion, the blood escapes into the peritoneal cavity. When the tube ruptures, the blood, in most cases, also finds its way directly into this cavity. In a second proportion, however, the rupture takes place in that portion of the tube which is uncovered with peritoneum, and blood is poured between the layers of the mesometrium, or broad

ligament, and is usually limited in amount. Generally speaking, an intra-peritoneal rupture is a fatal accident, as death may ensue, in a few hours, from shock, or be induced by secondary changes, such as peritonitis. When haemorrhage is great, unless surgery promptly affords relief, the patient quickly dies; in other cases, the haemorrhage may be so slight as to give rise to no marked symptoms. When an apoplectic ovum is discharged from the Fallopian tube and lodged between the layers of the broad ligament, it, in many cases, becomes encapsulated, and causes no further trouble. When a living ovum is thus lodged, it frequently continues to grow.

Zedel³³ agrees with Werth, in including, under the term tubal abortion, all tubal pregnancies where the ovum is projected at the abdominal ostium from the unruptured tube into the peritoneal cavity, with more or less haemorrhage. This is a relatively frequent termination of tubal gestation, and is the cause of a large proportion of cases of haematocele. Doran² reports a tubal abortion with tubal haematosalpinx, in which the patient underwent operation and recovered.

Symptomatology.—Croom³⁶ arranges the symptoms of extra-uterine pregnancy of the early months in the following order: (a) general and reflex symptoms of pregnancy, especially if the pregnancy has occurred after a considerable period of sterility; (b) disordered menstruation, especially metrorrhagia, coincident with symptoms of pregnancy, gushes of blood, accompanied by severe pelvic pain; (c) severe pain in the pelvis, attacks of pelvic pain followed by tenderness of the iliac region, and other symptoms of pelvic inflammation; (d) the existence of a growing tumor, presenting characteristics of a dense cyst, sensitive to touch, actively pulsating, and steady; (e) the os patulous, the uterus displaced and empty; (f) paroxysms of severe pain, and spasmodic pain in the pelvis, with general symptoms of collapse; (g) expulsion of the decidua, wholly or in part. He would make a diagnosis upon the following four grounds: (1) the general signs of pregnancy,—for example, the cessation of the menses; (2) the displacement of the uterus to one side by the tumor, which gradually grows; (3) the passage of the decidua, in whole or in part, in an irregular haemorrhage; (4) the presence of paroxysmal pain, localized to one side, though not to one spot.

Diagnosis.—Jaggard⁶¹ claims that the only condition that closely resembles early tubal pregnancy is pregnancy in a retroflexed uterus. In 1 case he found the vaginal portion of the cervix very much elongated; the lower uterine segment very thin and compressible,—so much so that one would not notice it at all unless attention was called to it. Behind the vaginal portion was a tumor; the woman had pain, slight haemorrhage, bearing down, and the discharge of something that was mistaken for decidua. In the genu-pectoral position the nature of the tumor was disclosed. It was a case of pregnancy in a retroflexed uterus. It cannot be accepted as a universal proposition that laparotomy should be performed in every case of ruptured tubal pregnancy. The natural history of the tubal pregnancy shows that, in the majority of cases, recovery results, there being 5 favorable terminations to 1 unfavorable. In the first place, the tube may rupture into the broad ligament, causing the formation of haematoma. Pregnancy, although relatively favorable, terminates for the time being. Sometimes the tube ruptures and the egg remains *in situ*, acting as a tampon, also a favorable termination; then we have the tube rupturing and blood forming a retro-uterine haematocele. Abdominal section should be performed when there are signs of free intraperitoneal haemorrhage, or when there is evidence that peritonitis will likely ensue.

Baldy^{62,63} considers the various symptoms usually presented to be of negative value, and reiterates the proposition made in a former paper as follows: (1) in a certain proportion of cases of extra-uterine pregnancy, in the early stages, the diagnosis is easy and unmistakable; (2) in a certain quite large proportion of cases sufficient symptoms are present, more than sufficient to warrant a diagnosis of extra-uterine pregnancy, such a pregnancy not being present; (3) in a certain other proportion of cases, the symptoms, until rupture has occurred, are entirely wanting, or are of such dubious character as in no wise to warrant such diagnosis.

Jaggard⁶¹ reports an extra-uterine pregnancy, in which death took place after delivery through the vagina, in the seventh month, the patient dying two hours later. Autopsy disclosed a retroperitoneal position of the foetal sac, which had originated in the right tube and had ruptured into the broad ligament. The following conditions, he states, should have led him to expect ectopic

gestation: 1. The abdominal tumor was quiescent throughout the period of observation. When the patient complained of abdominal pain, it was not accompanied by rhythmical contractions. 2. The maternal heart-sounds were transmitted uncommonly clearly from the area of the tumor, and the uterine souffle was absent. 3. The vaginal portion of the cervix remained relatively hard and unchanged in length during the eight days of observation. 4. The vaginal portion of the cervix was distinctly deflected to the right side of the median line.

Termination.—Schauta³⁶⁵ analyzes 626 cases of ectopic gestation, the collective mortality of which exceeded 41 per cent. In a spontaneous course it reached a mortality of 68.8 per cent. The most common form of ectopic gestation is that of tubal pregnancy; so frequent is it, indeed, as to have led some investigators to claim that all ectopic gestations are primarily tubal. That such statements are too sweeping is evident from the reports of such cases as those found below.

Eberhart¹¹² describes an ovarian pregnancy in which the tumor had attained the size of an egg; the tube was perfectly free. Jewett²⁷, reports a case of interstitial pregnancy in which the foetus attained 4½ months, the sac rupturing just behind the insertion of the right tube, the rent extending upward one or two inches. An attempt was made to suture the opening, but the patient died. Elbing⁴¹ reports a lithopædion found in the rudimentary horn of the uterus, while a normal pregnancy existed in the other horn.

Meyer, of Copenhagen, ² reports a case of repeated extra-uterine pregnancy in the same patient. Hart³⁶ says that one of the most frequent terminations of an advanced uterine gestation is its discharge like a pelvic abscess. The two great factors in producing a pelvic abscess are extra-peritoneal development and displacement of the placenta. By the first is meant gestation beginning in the Fallopian tube, developing in the broad ligament, and, if it continues, growing extra-peritoneally. The doubled-up foetus measures about nine inches, at the most, while from pelvic floor to navel is about six inches. This greatly limits the peritoneal elevation. He believes that cases of extra-uterine gestation ending in abscess begin in the Fallopian tube and develop in the broad ligament. In these cases the foetus lies below, and, as it

grows, displaces the placenta upward, which causes serious changes in the latter, the death of the foetus, and its subsequent discharge; consequently, the only hope for the safe development of the foetus in broad-ligament gestation is that it be above the placenta, so that in its subsequent peritoneal development it does not displace the latter. In the majority of cases, extra-uterine gestation begins in some part of the Fallopian tube, but very rarely develops to an advanced period in the intact tube. A good sectional and active demonstration of tube-pregnancy is still a desideratum. Ovarian pregnancy is one of the rarest occurrences possible. In tubal pregnancy we have the starting-point of most of the sequelæ of extra-uterine pregnancy: (a) rupture up to the third month, through the peritoneal part of the tube; (b) development in tube and broad ligament, with foetus above and placenta below. He would suggest the following scheme of classification: (1) ovarian pregnancy, extremely rare; (2) primary intra-peritoneal, not proven as yet, and improbable; (3) Fallopian tube, interstitial, in ampulla usually, tubo-ovarian, not well demonstrated. From the Fallopian-tube form we may have (a) rupture and intra-peritoneal haematocele (first and second month); (b) development in tube to nearly full term (excessively rare); (c) development in the broad ligament, intra-ligamentous, subperineo-pelvic; continued extra-peritoneal development, with placenta below, may result, in a living child; development, with placenta displaced, will result in the death of child, suppuration, and discharge by bowel; development, with placenta below, extra-peritoneal, will result in the escape of child, with or without amnion, into peritoneum. What we term abdominal pregnancy,—that is, advanced extra-uterine gestation,—may arise as follows: (a) from an early rupture up to the third month of a Fallopian-tube gestation, the foetus only escaping, the cord remaining unruptured, and the placenta remaining and developing in the tube (Croom and Webster); (b) development from Fallopian tube into broad ligament, foetus escaping into peritoneum, placenta remaining behind in extra-peritoneal tissue (Barbour); (c) development of foetus in placenta entirely extra-peritoneally (Hart and Carter).

Rupture.—Gunsser⁸⁵⁴ No. 6, p. 225 reports a case of tubal pregnancy, in which rupture occurred thirty-eight days after the first day of the last menstruation, and probably not more than thirty days after

impregnation. Oui ²³⁰ attended a young woman who had a rupture of the extra-uterine gestation-sac in the second month. With the application of ice to the abdomen and rest in bed, she recovered without operation.

Treatment.—Manly ⁵⁹ reports the case of a woman, in the fifth month of ectopic gestation, who fell into a trench, ruptured the sac, underwent abdominal section, and recovered. According to Thomas, but 2 cases are reported in this country in which the woman had recovered after traumatism in ectopic gestation past the fourth month. Smolsky ¹¹² says that in tubal pregnancy the sac, in the first month, reaches the size of a pigeon's egg; in the beginning of the second, the size of a walnut; midway between second and third, that of a hen's egg; in the third month, that of a fist; in the fourth month, that of two fists. In a case in which he examined and diagnosed as extra-uterine pregnancy, another physician diagnosed a blighted ovum *in utero*, coincident with pelvic tumor. Acting upon this idea, he etherized the patient, dilated the cervical canal with Hegar's dilators and curetted the uterine cavity. The patient died eighteen hours later; post-mortem examination showed a ruptured tubal pregnancy at the fourth month and an intra-peritoneal haemorrhage. He very properly advises against operations upon or instrumental examination of the uterus where there is any reason to suspect the existence of uterine gestation. The treatment of ectopic gestation is now generally recognized to be largely surgical, and the only question is as to the time when the surgical procedure shall be deemed necessary. There are still, however, a few advocates of destruction of foetal life by electricity. Martin has made experiments with a view to determine which current of electricity shall be used in order to bring about the death of the foetus. In experimenting on some cases in different periods of incubation with a strong faradic and with a strong galvanic current of 50 milliamperes, it was found that 80 per cent. of the eggs acted upon by faradism hatched, while not one of those treated by the galvanic current did so. Of those acted upon during the third week of incubation, 60 per cent. treated by faradic electricity remained undisturbed, while not one of the chicks treated by galvanism pierced the shell. Banga ⁶¹ remarks that as gestation progresses the danger from haemorrhage increases, there being no protective

tissue to stop the gush of blood issuing from the placental insertion. It is of the greatest importance not to disturb the placenta in the more advanced stage of ectopic gestation. Where rupture occurs less frequently, he would try Thomas's plan of electricity, as the first preparatory step to the later laparotomy. In case a pregnancy, for some reason, however, has been allowed to go on to full term, the child has also some claim to consideration. Here we might, in order to save a viable child, postpone laparotomy until labor begins, being ready to operate at any time if symptoms of rupture of the sac should demand it. The safest way to treat the placenta, under such circumstances, seems to be not to attempt to detach it. Stitch the sac to the abdominal wound, pack with iodoform-gauze, and wait for spontaneous loosening of the after-birth.

Surgical Treatment.—Montgomery⁶¹, states that rupture of the sac in a tubal pregnancy may take place at any time between the third and thirteenth weeks; in such a case the physician has no time for tentative measures, but must resort to a radical procedure in order to save the life of the patient. We have no reason to believe that the embryo in the foetal sac or any other portion of the sac would differ from that which takes place in the cavity of the uterus. Here, it is true, the foetus may die, may undergo the process of maceration and entirely disappear, but its envelope remains, and may continue to retain its viability for some months before it is thrown off. The sac formed in the tube or ovary may not be so readily eliminated, but it remains an organized mass which the organs of the patient must sooner or later be called upon to take care off, and, hence, may result in trouble of such a character as ultimately to necessitate operative procedure for its removal. Electricity, in cases in which the diagnosis is sure, is not an absolutely certain agent in destroying foetal life, but the embryo may continue to develop, notwithstanding the use of very strong currents of either galvanic or faradic electricity. In many of the cases in which electricity has been used with supposed successful results, it is doubtless true that the sac ruptured, the death of the foetus occurred, and the subsequent recovery of the patient took place only as the result of natural conditions, and not at all as the result of the application of the agent itself.

Reed,¹ asserts that, in any case of ectopic gestation, the

patient must sooner or later submit to some form of operation to abate dangers greater than those offered by the knife in the hands of a skilled operator. All dangers, whether accidental or surgical, increase with the advance of pregnancy; hence, he advises the immediate removal of the ovum by abdominal section, strictly on grounds of safety to the patient. It is sometimes questioned, in rupture of the tube, whether we should operate at once or wait for the patient to rally from the shock; it should be remembered, however, that shock in this case is due to internal haemorrhage, and so long as it continues the serious condition of the patient remains. It is, consequently, just as important to open the abdomen and secure bleeding vessels as it would be if such vessels were bleeding externally. From the frequency of the recurrence of ectopic gestation, he would advise the removal of the other ovary and tube, for the desquamative salpingitis which is the cause of the extra-uterine gestation in one, without doubt, exists in both tubes. Moore¹⁸⁴ believes that the treatment of extra-uterine pregnancy should be surgical from the very beginning, and, fortunately, intervention need not await the death of the foetus and the obliteration of the placental vessels. During the operation, entire removal of the ovum is indicated; if any part is left, drainage is imperative. In certain cases the removal of the viable foetus by laparotomy may be indicated. In its development extra-uterine pregnancy follows the law of neoplasms. The diagnosis is sometimes very difficult. The two pathognomonic signs are expulsion of the membranes and contraction of the empty uterus.

Auger²²¹ thinks that extra-uterine pregnancy should be treated as a malignant neoplasm. According to Doléris, Martin, and Pozzi, it is one of constant danger, the gravest danger being that of haemorrhage. If the child has died and haemorrhage has followed, operation should be done. When the foetus is dead, it is preferable that it should be removed. Puncture of the cyst is ineffectual, as is also the injection of remedies into it by the syringe. The use of electricity is also inefficacious, and, in addition, it is a dangerous surgical procedure. It is important to keep in mind the position of the insertion of the placenta, as incision into it and opening the cyst may give rise to fatal haemorrhage. Cushing²³ reports the case of a woman, ten years married, who menstruated last in March and operation was done in November.

PLATE I.

Fig. 1.



Extra Uterine Pregnancy at Ninth Month. (Cushing)

A. Half of Placenta, which lay External to Sac, and was in a State of Fally Degeneration.

B. Half of Placenta, which lay in Sac, and was Alive and well supplied with Blood.

C. Twists in the Cord, which appear to have caused the Death of the Child.

Annals of Gynaecology and Paediatrics.



PLATE II.

Fig. 2.

B.



A

C.

The Reverse of previous Plate. Same explanation of letters.

When the sac was opened, a large quantity of vile yellowish fluid escaped, the stench from which was almost intolerable. A full-term foetus, dead and macerated, was removed; the placenta was removed from the sac and the sac itself stuffed with iodoform-gauze; the patient recovered. The accompanying diagram represents the appearance of the foetus removed. Byford⁷⁹ reports abdominal section twice in the same patient; section was done at three and one-half months, the patient recovering.

Vaginal Operation.—Fenger¹⁰⁰ says that the vaginal operation is only to be considered when the sac or foetus is situated so directly in the line of the uterine foci that it pushes the walls of this region downward so as to form a prominent tumor in the posterior wall of the vagina. This position of the sac occurs in about 10 per cent. of the cases. The mortality of the vaginal operation is about 50 per cent. Its dangers are from haemorrhage and retention of the placenta. The difficulty of delivery of the child through the vaginal opening is often great, and sometimes impossible. Of 13 cases of vaginal operation, delivery was impossible in 2 cases, and the patients died with the child in the sac. Craniotomy and cephalotripsy was necessary in 4 cases, of which 2 recovered. Delivery by version is especially dangerous in extra-uterine pregnancy, as the sac-walls are so thin that they will almost always rupture during manipulation. In 2 cases both mothers died from this cause. Of forceps-delivery, 3 cases were reported, all of which recovered. Delivery by simple extraction was easy in only 3 cases, 2 of which died. He concludes that, in cases where the foetal cavity is still aseptic, the vaginal operation exposes the patient to the dangers of sepsis in the foetal sac, which cannot be guarded against. Abdominal section gives far better protection against infection; haemorrhage of the placenta cannot be controlled by the vaginal operation. By abdominal section, on the other hand, ligation of the spermatic and uterine arteries, as advised by Olshausen, can be accomplished as a means of checking haemorrhage from the site of the removed placenta in the territory supplied by these vessels. Abdominal section, further, permits of ligaturing masses of the bleeding portions. When the placenta has been divided at the place of incision delivery of the child at term is usually difficult, and thus dangerous to the mother by the vaginal and easy by the abdominal operation. If the fate

of the child is considered, the vaginal operation must be abandoned and replaced by abdominal section. When suppuration has set in in an extra-uterine pregnancy, presenting low down in the pelvis, and the placental circulation has ceased, the vaginal operation may be considered in comparison with the abdominal. The vaginal operation is strongly indicated in old suppurating foetal sacs with disintegrating foetus presented in the vagina.

DISEASES OF THE VAGINA AND EXTERNAL GENITALS.

BY J. M. BALDY, M.D.,
AND
W. A. N. DORLAND, M.D.,

PHILADELPHIA.

CLITORIS.

Clitoritis.—Primary inflammation of the clitoris is of such extremely rare occurrence that the case reported by Philippeau¹⁵⁴ is deserving of special notice. The patient consulted him, about a week after menstruation, for an itching of the upper portion of the vulva of ten days' duration. On examination the vulva appeared to be normal in color, and there was no discharge from the urethra or vagina. The uterus was in a healthy condition. On separating the lips the clitoris was found to be enlarged, reddened, and excoriated, its entire surface discharging an abundant purulent secretion. The hood was also inflamed and swollen; the vulva-vaginal glands were normal. The accompanying symptoms were a marked sensation of heat, exaggerated sensibility of the parts, and some impediment to locomotion, together with intense venereal desire, resulting in great fatigue and loss of sleep. The condition could not be referred to any exciting cause, but, as the patient had had two previous attacks within six years, Philippeau was inclined to the belief that there was a rheumatic origin. Under soothing lotions and the application of cocaine ointment the inflammation rapidly subsided.

Carcinoma.—F. J. Merkle³¹⁷ observed this disease in a woman 61 years of age. At the site of the clitoris was a tumor of about the size of an apple, already beginning to break down. There was an indurated gland as large as a walnut in the left groin. The tumor of the clitoris was removed by means of the thermo-cautery. The patient died seventy-three days after the growth was removed. At the necropsy epithelioma of the clitoris, with metastatic deposit in the lymphatic glands, was discovered. It is probable,

as Merkle believes, that the clitoris was the seat of the primary disease.

HYMEN.

Imperforate Hymen.—H. W. Frimner¹⁸⁶ reports an interesting example of the so-called cribriform hymen occurring in a woman, aged 26 years, whose entire menstrual history pursued an anomalous course. Puberty occurred at the age of 10, was accompanied with considerable pain, and but scanty flow, of a peculiar muddy color, containing stringy clots. This continued, with more or less regularity, until she presented herself for examination, when a tumor of the size of a hickory-nut was found protruding from the vaginal orifice. Pressure produced a slight oozing on either side of the meatus urinarius, the fluid coming from two pin-hole openings. An operation was performed for the relief of her condition, and pregnancy followed in two months' time. Burford²⁷¹ has met with a case of hymen circularis, which presented the unusual feature of regular and profuse menstruation through a central pin-hole opening in a tough membrane one-eighth of an inch in thickness. Mention is made by Hemenway²⁷² of a patient with retention of the menstrual fluid for at least three years, resulting in a distension of the vagina, uterus, and left Fallopian tube. The slow method of evacuation was adopted, with a perfect result. From a study of 81 reported cases of operation for the relief of imperforate hymen the author concludes that gradual evacuation of the retained secretions is to be preferred. Of the above cases, 25 were operated upon by the gradual method, with 1 death, giving a mortality of 4 per cent.; while in the remaining 56 cases, rapidly evacuated, there was a mortality of 7, or 12.5 per cent. The dangers of the operation are (1) poisoning; (2) rupture of the Fallopian tubes; (3) peritonitis, the result of sepsis, regurgitation, or rupture. He claims that the danger of sepsis is greatest when the opening through the hymen is large. Ross,⁶¹ in order to prevent collapse from sudden removal of the fluid, inserts through the opening made in the hymen the nozzle of a syringe attached to a well-elevated douche-pail, and flushes the cavity with pure water until all the treacly discharge has been washed out, no compression being made upon the abdomen. Then, while the cavity is still distended with fluid, iodoform gauze is packed in, the water escaping as the gauze is introduced. He

urges the importance of this replacement of the fluid by something that will be antiseptic, soft, and unirritating, and that will afford good drainage and sufficient support. When sudden symptoms occur at a late period—from sitting up, sudden straining, coughing, or other efforts—the sooner the abdomen is opened and drained the better. He would distinguish between the symptoms arising from a septic inflammation affecting the vagina, uterus, tubes, ovaries, and peritoneal cavity, ascending from below, and peritonitis due to ruptured adhesions or escape of fluid into the peritoneal cavity. In the septic cases the vagina becomes tender and thickened, the uterus enlarged, tender, and soft, the cervix swollen, and the whole uterus presents the appearance that is seen immediately after parturition; on the other hand, in the second form of the complication the symptoms are sudden in their onset and secondary to some indiscretion. Forbes²⁶⁷ reports a case of acquired atresia hymenalis, following the healing of a syphilitic sore, cured by operation.

VULVA.

Pruritus.—By far the most valuable paper of the year is that of J. C. Webster,²⁶⁸ in which the author proves that the most important factor in the etiology of the disease consists in some microscopical changes of the nature of a slowly progressing *fibrosis*, affecting chiefly the nerves and nerve-endings of the clitoris and labia minora. Many of the nerves acquire a dense, fibrous character, some appearing as well-marked fibrous cords, the nerve-fibres being compressed or destroyed. These changes are especially marked in the clitoris. The Pacinian corpuscles do not appear to be affected; some globular end-bulbs show an increased number of cells, whilst others appear as dense, fibrous knobs. Some of the genital corpuscles show the change in a marked degree. The connective-tissue frame-work of the clitoris and hypertrophied nymphæ show changes of a subacute inflammatory nature, as evinced by an abundant exudate into it of leucocytes, together with the presence of proliferating connective-tissue corpuscles. Basing his views upon the above pathology, Webster concludes that the only way in which a complete cure may be effected is by the *thorough removal of the affected parts*. His operation consists in the removal of a spindle-shaped mass of tissue, extending from half an inch above the clitoris as far down as a point midway

between the glans and the urethral orifice, the removed portion consisting mainly of the greater part of the clitoris and the upper part of the nymphæ. This method of treatment has been very successful in his hands. Cholmogoroff³¹⁷ has employed the constant electric current in a very obstinate case of pruritus, with a perfect cure in six weeks' time. Applications of 20 milliampères for ten minutes were repeated on alternate days, suspending the treatment during the catamenial period. Papin⁶⁵ recommends the protiodide of mercury and the iodide of potassium in all cases in which a specific taint may be suspected.

Kraurosis.—Orthmann, of Stettin,³⁹⁸ has tabulated 26 cases, to which he adds 5 from Martin's clinic, at Berlin. W. Frederick⁷⁸⁰ reports a case cured by applications of Churchill's tincture of iodine twice weekly. The disease consists mainly of premature atrophy of the vulvar structures, a hyperplastic stage preceding the atrophic processes. The manifestations of the later stage are stenosis of the vestibule, with dryness, sliminess, and a cicatricial condition of the integuments, including the labia minora. No reliable results have followed the bacteriological researches. Frequently intolerable itching and burning are produced by the disease. Martin advocates, for the radical cure of the affection, complete excision of the diseased area of integument, and closure of the wounds thus made by sutures.

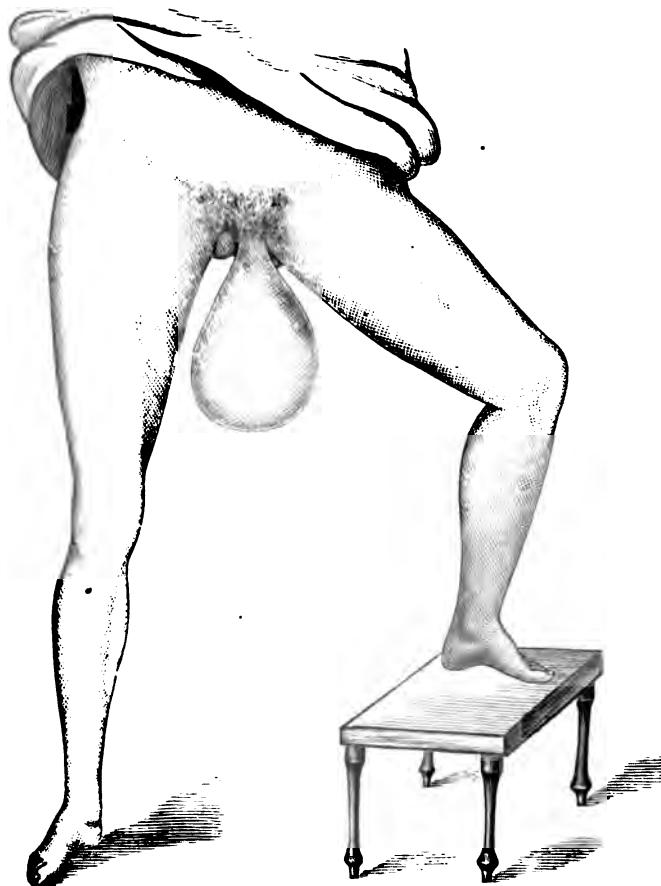
Cysts.—Among the cysts encountered in this region may be grouped the cases reported of that rare affection,—*congenital hydrocele in women*. Smital collected 41 cases, previously reported.⁸ He now adds another instance under his own observation,³¹⁷ occurring in a woman 36 years of age. A large, elastic tumor occupied the upper part of the right labium majus. It was broader below than above, and its long axis was continuous with that of the right inguinal canal. It was irreducible, and there was no resonance on percussion nor impulse on coughing. The cyst was exposed by an incision in its long axis and dissected away. Posteriorly and internally it was connected with the round ligament. The pedicle of the cyst entered the inguinal canal, and contained a cæcal prolongation of the peritoneum. The cystic fluid amounted to about 6 ounces (180 grammes), was clear, serous, and neutral in reaction, of a specific gravity of 1015, and contained 3.5 per cent. of albumen.

J. Lammert,³⁴ is uncertain as to the true etiology of hydrocele in woman, but believes that it may result from trauma or from any inflammatory irritation of the canal of Nuck. The predisposing cause he believes to be the period of gestation and puerperium. During this time the round ligaments of the uterus become greatly enlarged, and, under these circumstances, increased secretion may take place in Nuck's canal. During labor the round ligaments contract powerfully, and, rupture of the small vessels in the inguinal canal at times following, bloody cysts may be produced, which eventually develop into a hydrocele. The most frequent age for the development of hydrocele is the time of puberty. It less frequently is found before this period, and not at all in old age. Smital advises entire extirpation of the cyst, while Lammert recommends that the small hydroceles be left alone, reserving the radical operation for the larger ones. In some instances he employs injections of iodine, or of a 3- to 5- per-cent. solution of carbolic acid, into the sac, after evacuation of its contents.

According to W. M. Conant,³⁹ cysts of the labium may occur in the vulvo-vaginal glands when they are true retention cysts; in the mucous glands of the labia; from retention in Gartner's canal, a foetal structure usually obliterated; in the capsule about old blood-clots; and in enlarged lymphatic spaces. The cyst-wall is thin, but firmly adherent to the surrounding parts. The contents are usually a clear, watery fluid, but may be dark brown, thick, or even purulent. Cases are reported by Conant and Monnier,² the latter occurring in a child of 6, of a peritoneal origin, although not connected with a congenital hernial pouch. Bagot¹⁶ has met with a case of cystic formation in both labia minora and the under surface of the clitoris. The wall of the cyst contained several smaller cysts, all containing a creamy fluid, with cholesterolin crystals and fatty débris. Chase¹⁵⁷ and Briesenick⁷⁰⁰ have met with abscess of the vulvo-vaginal gland.

Tumors.—Polaiillon⁵⁵,_{age 6} reports an enormous fibromyoma of the left labium majus in a woman of 45 years. The tumor extended into the inguinal canal, in the form of a cord as large as the index finger, and was nothing more than the hypertrophied round ligament. The growth had attained the size of the head of a child of 1 or 2 years, and was composed of dense, fibrous

tissue. It had developed at the point of insertion of the round ligament in the sac of Broca. An elephantiasic tumor of the vulva, developed from the clitoris and the labia minora, is described by Pérignon.²²⁰ It occurred in a woman 28 years of age, and had ulcerated in its lower portion, discharging a horribly



FIBROMYOMA OF LABIUM.
(*Gazette Médicale de Paris.*)

offensive secretion. The patient was cachectic and feeble; but, after removal of the growth by section of the pedicle with the thermo-cautery, she made a slow but complete recovery. In the treatment of non-syphilitic vegetations of the external genitalia, Tchernomordik¹⁵⁴ _{ref. 15} advises the employment of Bockhart's caustic lead, prepared as follows:—

R. Oxide of lead, 0.25 centigramme (8½ grains).
 Sol. caustic potash (33 per cent.), 0.50 centigramme (8 minims).—M.

This mixture is painted over the vegetation by means of a pledge of cotton wrapped around a small rod or stick. Usually, one sitting will suffice. Caro Urriola prefers a pigment, composed of 2 grains (0.13 gramme) of salicylic acid to 30 grains (1.94 grammes) of acetic acid, applied two or three times in the twenty-four hours.

URETHRA.

Urethritis.—Alexis L. Ebermann⁵⁸⁸ read a paper on this subject before the St. Petersburg Obstetrical and Gynæcological Society, in which he pointed out that on endoscopical examination a normal female urethra is characterized by the following features: (1) the mucous membrane of the canal is traversed with radial folds; (2) the urethral orifice appears in the shape of a darkish spot; (3) with regard to color, the urethral mucous membrane closely resembles the oral one; (4) the muciparous glands are invisible. The author believes that in the great majority of instances *acute urethritis* is of an infectious (gonorrhœal) origin, a traumatic causation being very rare. The subjective symptoms are usually trifling, dysuria and strangury occurring only in a small proportion of cases. On inspection, the outer orifice of the urethra is of a dark-red color, with a bluish tint, and occasionally surrounded with gonorrhœal condylomata; the walls of the canal are usually tumefied, and pressure may squeeze out from the meatus a drop of pus; haemorrhage is met with only in exceptional cases. An endoscopical examination shows the mucous membrane to be of a dark-red color, and quite smooth from a complete obliteration of the radial plicæ. Usually, the subjective symptoms are altogether absent in cases of *chronic urethritis*, the patient being reminded of her affection mainly by the appearance of pus-spots on her linen. By the endoscope the urethral mucous membrane is found to be dark red and void of the radial folds, but studded with granulations, which may be scattered over the canal or limited to one of its walls. In certain cases there are simultaneously detected clusters of hypertrophied mucous glands, as well as fissures in the vicinity of the neck of the bladder. As to the treatment, Ebermann regards the expectant method as best in acute cases, while in chronic urethritis iodoform bougies, painting with nitrate of silver, 1

drachin (3.89 grammes) to 1 drachm (3.75 grammes) of distilled water, or with iodine tincture, should be resorted to. Condylomata may be cauterized, or snipped off with scissors.

Stricture.—In regard to the origin of this rare condition, Otis, of New York,²⁴⁵ is convinced that the foundation of at least the largest proportion of the cases consists in cicatricial deposits, due to lithiasis, at periods often long antecedent to the gonorrhœa to which they are attributed. These strictures are productive of severe reflex irritations and neuroses, which may be attributed to causes quite independent of their relations to the urethra. In such cases Otis suggests the desirability of early exploration of the urethra, by means of the urethrometer or the bulbous sound, to demonstrate the condition present. Cases are reported by Otis and Barnes.^{246, 247} Fort¹⁵⁴ urges the importance of linear electrolysis in the treatment of stricture as preferable, in the majority of cases, to urethrotomy.

Prolapse.—Bagot¹⁶ regards a slight degree of prolapse of the urethral mucous membrane as a very common occurrence, although annular or complete prolapse is quite a rare condition, both Winckel and Parvin having met with it but once. The prolapsed mucous membrane presents itself on the vestibule as a tumor of a bright-red or purple color, varying in size from that of a cherry to that of a large walnut, the meatus urinarius being situated on some portion of its surface, usually about the centre. The prolapsed membrane is extremely sensitive, and bleeds readily on being touched; it gives rise to vesical tenesmus, dysuria, or even retention of urine and dyscinesia. Spontaneous cure may result from strangulation and sloughing. The author believes with C. Ruge that the condition is probably of the nature of a vascular tumor, consisting of widely-dilated vessels set closely together, rather than of a true primary prolapse of the urethral mucous membrane. The treatment consists in thorough removal of the prolapsed mass. Cases are reported by Bagot and Södermark.²³

Caruncle.—J. W. Hamilton¹⁴³ reports 2 cases treated successfully by injections into the tumors of the glycerole of carbolic acid after brushing the parts with a strong solution (8 per cent.) of cocaine. The relief was immediate and the cure perfect. Heffelfinger¹⁷⁶ advises excision with cauterization, and reports 2 cases successfully operated upon. MacFarlane²⁸⁴ distinguishes caruncle

from prolapse by the situation of the tumor. Caruncle is almost invariably on one or both sides of the meatus, whilst prolapsus is usually on the posterior margin of the meatus, owing to the imperfect support this part of the urethra receives from the loose interurethro-vaginal cellular tissue.

BLADDER.

Exploration of the Bladder.—The procedure recommended by Ross,²⁹ where the cystoscope has failed, is as follows: Cocaine may be first used as an intra-urethral application. The patient lying on the back, with the knees drawn up upon the abdomen, the little finger, with pared and soap-filled nail and oil-smeared, is gradually pressed through the urethra after the bladder has been evacuated. The other fingers are flexed upon the palm, and the hand pronated until, by bending the body over slightly, the ulnar edge of the arm is toward the ceiling of the room, the upper arm at an angle of 90 degrees with the body, and the elbow at an angle of about 145 degrees. The hand is pressed upward and the whole finger enters the bladder. In this way the orifices of the ureters may be readily felt, and the whole bladder-wall explored in a few moments. Meyer, of New York,¹ urges the importance of the cystoscope in clearing up obscure bladder disease, and in aiding in the diagnosis of renal trouble.

Enuresis.—Sänger³² treats enuresis in the female by the following procedure, with excellent results. He introduces a metal catheter, five to seven centimetres deep, into the bladder. While the index finger of the right hand closes the end of the catheter, the left index finger is placed on that part of the catheter which is just outside of the meatus urinarius, and firm but elastic pressure is exercised by this finger, first downward and then to either side. In this manner the sphincter vesicæ and the muscles of the urethra are forcibly stretched. H. Marion Sims¹⁰¹ urges the method of treatment—which is original with him—of forcible dilatation of the contracted bladder by means of tepid water. The treatment must be continued for several weeks, or even for months, before a cure will be obtained. This method, according to Bagot,²² is nothing more than the application of the principles of massage in the treatment of contracted bladders.

Cystitis.—J. M. Richmond⁶⁶³ has performed Alexander's

operation for shortening the round ligaments in a patient, for the relief of continual cystitis. The woman suffered from prolapse, urethrocele, cystitis, fissure of the urethra, and urination every fifteen minutes. The operation was thoroughly successful, and seven months afterward the patient urinated every two hours only during the day and was able to rest at night.

Necrosis.—According to Lockhart,²⁵² the membrane discharged from a necrotic bladder may be readily diagnosed from a false membranous formation. In the latter we find leucocytes, held together by bands of fibrin or connective-tissue fibres, if the condition has become sufficiently well organized; and it may contain more or less degenerated cells from the subjacent tissue. In the specimens from necrosis of the bladder we find broken-down granular cells, held together by bands of fully-formed white fibrous and yellow elastic tissue. The presence of muscular tissue in different stages of degeneration the author holds to be further proof of the process being a necrosis of previously-formed tissue, and not of the formation of new tissue. The causes of this affection of the bladder he believes to be mechanical injury and interference with the circulation following prolonged and difficult labor. There is absolutely no means of diagnosing the condition from that of ordinary cystitis until the membrane is found either protruding from the meatus urinarius externus or by means of the urethral speculum. The prognosis as regards life is good, and, unless the whole lining of the bladder has come away, control of the sphincter is regained sooner or later. The treatment is the same as for the ordinary forms of cystitis. Cases are reported by Lockhart and Foley.¹

Inversion of the Bladder.—A case of inversion of the bladder, of twelve years' standing, is reported by McKay.²⁵⁷ The trouble developed from the constant straining and tenesmus attendant upon a prolapsus recti, and appeared as a semi-elastic tumor the size of a large hen-egg, pyriform in shape, protruding from the vulva. The tumor was vascular, and covered with a grayish, gelatinous, mucoid substance. There was complete absence of the clitoris, meatus, and urethra, the urine dribbling away from a small opening on the under surface of the tumor near its pubic attachment. The bladder was returned by gentle digital pressure, and the calibre of the meatus lessened by freshening its surfaces and

bringing the sides together ; but the patient died, in thirteen days, from pyæmia.

Calculus.—Guyon⁴⁸ removed from a woman, 51 years of age, a vesical calculus, which had formed as a result of a previously existing cystitis, by the operation of lithotomy. The difficulty of this operation in women resides not in the introduction of the instrument, but in the bladder itself, which is either very sensitive and will not permit of distension, or, on the other hand, is too readily distended. Phocas⁴⁸ has collected numerous cases of spontaneous expulsion of vesical calculus in women, and notes that authorities admit that the female urethra may be dilated to a considerable extent without consequent incontinence of urine. The expulsion of calculi during labor has frequently occurred. He prefers dilatation of the urethra for the removal of calculi to cystotomy. W. O. Roberts²²⁴ has removed stones from the female bladder in 6 instances through the urethra, the ages of the patients ranging from 15 to 56 years. The extraction was done in every case under chloroform, the patient being profoundly anæsthetized. Porter²⁸⁹ reports 1 case removed through the urethra. Reamy²²⁴ removed a stone weighing 365 grains (24 grammes) by vaginal cystotomy from the bladder of a girl 6 years of age, with injury of the ureter, followed by the discharge of urine into the tissues of the bladder-wall. Operations for closing the bladder were difficult, but ultimately successful. Brewis³⁶ and Leslie³⁹ have successfully removed large calculi by vaginal cystotomy.

Foreign Bodies.—Remarkable instances of the finding of foreign bodies of every description within the bladder continue to be reported in the journals. May⁶ and Pamard¹⁵⁴ removed lead-pencils, which had probably been used for the purposes of masturbation. In Pamard's case the vesico-vaginal wall had been perforated. Dittel²² relates the case of a woman, aged 49, who, after an ovariotomy, had had a ligature put in the posterior surface of the bladder. This eventually found its way into the cystic cavity, where it was discovered by means of the cystoscope, and removed by a polypus-forceps made to pass through the cystoscope. Stumpff⁸¹⁷ describes the case of a shop-girl, aged 23, who was under treatment in the hospital for severe cystitis. Hæmorrhage from the bladder occurred suddenly, and in the bloody urine thin lamellæ of a grayish, greasy, scented material were detected. After

dilatation of the urethra a white pigeon's feather was removed from the bladder, together with some more of the scented soap or ointment. He also removed from a woman aged 42 the ivory handle of a crotchet-needle, which had been inserted into the urethra in order to facilitate micturition, but which had slipped into the bladder. Although it had lain but a few days in the bladder it was already encrusted. Hair-pins were found by Currier¹, and Pousson,¹⁸⁸ and a white-rubber womb-protector, completely encrusted with phosphates and measuring six centimetres in diameter, by Mullen,⁸² in a woman aged 26.

Tumors.—A papilloma of the bladder was removed from a woman, aged 63, by Way,²⁷ who performed a supra-pubic cystotomy. The patient was placed in Trendelenburg's position, which greatly facilitated the manipulations. Recovery was rapid and complete. D. W. Cadwallader¹⁹ reports the removal of a fibro-papilloma occurring in a woman 30 years of age. The patient was placed upon the expectant treatment, as there seemed a decided tendency of nature to expel the growth. Fragments were discharged from the bladder every few days for a period of about four weeks, by which time the tumor had almost disappeared. Janvrin²⁷ reported a case of *primary villous carcinoma* of the bladder occurring in a woman, 60 years of age, who had presented the symptom of haematuria for about three months and a half with severe pain. The growth was partially removed by the dull curette.

VAGINA.

Vaginismus.—Lomer³¹⁷,₁₉₀ reports 2 cases of vaginismus in married women in which the galvanic current was used successfully. The negative electrode was applied to the abdomen and the positive upon the perineum at the vaginal entrance. The current used was of weak intensity, and, after a few applications, the spasm of the vulvar sphincter gradually became less violent, and the cure was eventually complete.

Atresia.—The importance of an early diagnosis of this condition, so as to anticipate and prevent the occurrence of haematometra to any extent that might lead to the rupture of the distended uterus or tubes, is urged by Madden.²²,₁₉₀ There is a paramount necessity, in all instances of operative interference, to secure the permanent patency of a sufficient passage for the free

external escape of the menstrual fluid, and thus obviate its possible intra-peritoneal extravasation through the Fallopian tubes. Operation should never be resorted to, however, until the existence of the uterus and its appendages has been positively ascertained. Larin²²¹ gives, as the causes of the acquired form, the adynamic forms of typhoid fever, malignant scarlatina, variola, very frequently syphilitic ulcerations, various neoplasms,—especially cancer, which acts by cauterization,—vesico-vaginal fistulæ, and difficult labors. In the majority of cases the upper part of the vagina is the point of election for the contraction, in contradistinction to the congenital form, which is most generally found at or near the vulvar orifice. As regards treatment, surgical intervention is always required. F. Bessel-Hagen⁸⁴ reports a case of haematoma of the external genitals associated with atresia hymenalis in a girl of 16. The vaginal accumulations had ruptured spontaneously into the vagina. A drainage-tube was inserted and a bandage applied. Cook¹²⁰ reports a case of congenital atræsia with haematocolpos relieved by operation, and similar cases are described by Yagishita,²⁰⁰ Mattersdorf,⁸¹⁷ and Barsony.⁵⁵⁹ Léon¹⁸⁸ records a partial occlusion of the vulva by a cicatricial bridge secondary to the postero-lateral incisions of P. Dubois to prevent a laceration at the time of the passage of the foetal head. When it becomes necessary to make these incisions, he urges the importance of extreme care in the after-treatment to prevent this distressing sequel. Chipault¹⁴ has met with a patient in whom the labia minora were united by a membranous formation. Notwithstanding the anomalous condition, the patient was in the sixth month of gestation. Robb⁷⁶⁴ encountered an atræsia of the vagina associated with absence of the cervix uteri, and with a double dermoid cyst communicating with an adherent loop of the ileum. The woman died of diphtheritic colitis, with amyloid degeneration of the liver, kidney, and spleen, and chronic Bright's disease.

Vaginitis.—According to Neumann,⁶⁹ the papulous form, which is not rare, does not arise from the follicles of the vaginal wall. He finds that the very existence of follicles is doubtful; the few follicular structures which have occasionally been detected were probably abnormalities. On the other hand, the appearance of little elevations—the chief symptom of colpitis papulosa—is

frequent. The elevations are, in short, not follicles, but diseased papillæ, which have for a long time been known to exist in the vaginal mucous membrane. Atrophic colpitis appears in two forms: the first is seen in multiparæ and women who have cohabited for many years; the second is essentially senile. In the former the papillæ become flattened, the epithelium thickened, its superficial squamous cells disappear, and the rete atrophies. In the senile form the epithelium undergoes the same changes, but the tissue of the corium, the smooth muscle-fibres, and the vessels are all involved in the general atrophy of the part.

Montgomery,¹⁹ classifies the causes of vaginitis as follows: (1) contact with specific poison; (2) contact with various irritating mechanical agents used for disinfecting or examining purposes; (3) traumatism due to parturition, excessive or violent coition, or to the use of the pessary; (4) discharges from the uterus or sinuses from abscesses opening into the vagina, such as pyosalpinx, or from the sac of an extra-uterine pregnancy. Herman,²⁰ reports a case of the so-called "emphysematous vaginitis," or vaginitis associated with the formation of gas-cysts, occurring in a nullipara aged 28. The vagina presented an uneven surface, as if studded with hard nodules, which were closest together on the upper portion of the posterior wall. They were grayish-black in color, and very tense, varying in size from a hemp-seed to a pea. Each vesicle, when pricked, collapsed with a distinctly audible pop, no fluid escaping. Vibert and Bordas,²¹ after a careful investigation from a medico-legal point of view, have concluded that microscopical examination of the discharge of vaginitis and vulvitis never enables an expert to affirm that a particular case is or is not gonorrhœal. They find the gonococcus practically indistinguishable from the diplococcus. In the treatment of follicular vaginitis Montgomery regards the thermo-cautery as the best method of destroying the growth of papillæ. Godfrey²² says that vaginitis tends to recur after its apparent cure, on account of the folds of the lining membrane of the vagina retaining the discharge. The treatment, therefore, should be persisted in until all indications of the disease have passed away. Acute vaginitis can be best combated, as a rule, by the combination of the wet and dry methods of local treatment.

Vulvo-Vaginitis. — Vernon²³ prefers the division of vulvo-

vaginitis, as occurring in children, into the two forms of *infectious* and *non-infectious*. The infectious variety is caused by contact with the virus of leucorrhœa, gonorrhœa, or diphtheria. The indications for treatment are: (1) to remove the cause; (2) to counteract any constitutional vices; (3) absolute cleanliness; (4) local applications to allay the inflammation. Jules Comby⁴²⁰ _{July 25} unhesitatingly declares that this disease is hardly ever of venereal origin. It is always most frequent among the poor. The disease is undoubtedly contagious in the great majority of cases. He has no belief in the value of the gonococcus as an element in the diagnosis. As to cure, sulphurous baths should always be given at the outset. In the chronic forms codliver-oil and iodide of iron must be given. Cohen-Gras³⁴ _{Oct. 15} recommends oil of sandal-wood, 5 to 10 drops, three times a day, internally in all cases.

Abscess.—Two cases of abscess of the vesico-vaginal wall are reported,—one by Malherbe¹⁶⁴ _{Apr. 10} and the other by Lannois.²⁴ _{Apr. 12} Both were relieved by operation. Traumatism was the cause in both instances.

Trauma.—The prophylactic treatment of laceration of the anterior vaginal wall during labor consists, according to Watkins,¹⁰⁰² in the support of the vesico-vaginal septum while the foetal head is entering the true pelvis, in the prevention of excessive pressure of the head upon the pubic arch (Schatz), and in the employment of the usual measures for hastening involution. For the repair of a laceration already existing he suggests a lateral instead of the usual median operation. Denudation extends from a point to the side of the urethra near its meatus, along the antero-lateral walls of the vagina to a point beyond the prolapse. The breadth of the denuded surface is dependent upon the extent of the urethrocele and cystocele. Buried silk-worm-gut sutures are inserted, beginning at the uterine end of the denudation. Baldy¹³⁹ _{Apr.} has collected a series of 26 cases of injuries following coition; and Haynes²⁷ _{Nov. 10} reports a case of vaginal haemorrhage from a first coition followed by septicæmia and death. Eklund²¹¹ _{Sept. 12} encountered a rupture of the vagina during coition in a young woman 20 years of age. A severe haemorrhage from cauterization of the vagina is reported by Betrix.³⁵⁴ _{Oct. 10} The caustic—a large tampon soaked in “*eau-de-Rubel*,” which contains 1 part of pure sulphuric acid and 3 of absolute alcohol—had produced extensive

sloughing of the vaginal walls, accompanied with severe haemorrhage. The woman had inserted the tampon, on the recommendation of a friend, to arrest her menses, which were prolonged over the usual period.

Foreign Bodies.—Szigethy ⁵⁵⁹ removed from the vagina of a patient, 75 years of age, a ball of twine which had been inserted thirty years previously. At that time, while suffering from pelvic pains, she noticed that something, probably a prolapsed uterus, protruded from the vulvar cleft, and, on the advice of a neighbor, dipped a small ball of twine in hot wax, reduced the protrusion, and introduced the ball into the vagina. The ball, when removed, measured seven inches in its smaller circumference, was yellowish-brown, and covered with a dense deposit of mucus.

Cysts.—Cysts of the vagina are classified by Rutherford ⁶ as submucous, interstitial, and circumvaginal, though the author prefers the classification of superficial and deep, as it expresses their situation more accurately from a clinical point of view. They are most frequently found in married women of middle age. He believes that in all probability there is an absence of glands in the vagina, although vaginal crypts are present, and from these crypts it is possible that cysts might occasionally arise under pathological conditions. He concludes that vaginal cysts are derived from various sources, and may be divided into two classes: 1. *Accidental*—originating (a) in crypts of the vagina in a few instances, by occlusion of their orifices and subsequent dilatation; (b) as effusions of serous fluid or blood into the connective tissue; (c) in dilated lymph-channels; (d) in glands of the urethra; (e) in hydatid cysts, which variety should not be included amongst vaginal cysts. 2. *Congenital*—(a) from persistent remains of Gärtnér's canals; (b) from persistent remains of Müllerian ducts. Heydrich ⁸¹⁷ puts on record a case of the rare condition known as diverticulum recti spurium, which was probably due to perirectal abscess, following an ulceration of the bowel, above an existing stricture. A case in which three cysts were found in one vagina is reported by Schmal. ⁸¹⁷

Tumors.—Oleinik ⁴²² describes a case of multiple *myomata* of the vagina, in a patient 32 years of age, attended with excessive haemorrhages. Foulerton ⁶ removed a number of papillomata from the vagina of a woman aged 46. They varied from the size

of a horse-bean to that of a large walnut. Hæmorrhage was checked by the benzin cautery. The origin of the tumors was probably in gonorrhœal warts. Hecht³¹⁷ has collected some valuable evidence on *primary cancer* of the vagina. It most frequently

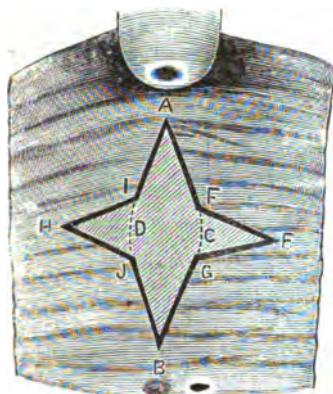


FIG. 1.
(*Annals of Gynaecology.*)



FIG. 2.

occurs during the fourth decade, and its development seems to be favored by the mechanical irritation from pessaries and vaginal prolapse. It occurs in two forms,—the first a malignant papillomatous mass, and the second a diffuse variety. It is only in the later stages of vaginal cancer, if at all, that the disease extends to the *portio vaginalis* of the cervix or to the external genitals. When complicating pregnancy the condition is extremely grave. Cases are reported by Oliver,¹⁸⁷ in a woman aged 26; Coley,¹ in a patient 21 years of age; and Lepré-vost,⁸ in a woman of 32 years. Oliver's case died; the others were relieved by operation. Kliegl⁵⁷ has employed injections of pyoktauin in cases of cancer with considerable success, an injection of a solution (1 in 500) being given every third or fourth day. Under its influence the hard, resisting tissue gradually softened and melted away, leaving a sort of skeletal frame-work as a remnant of the swelling.

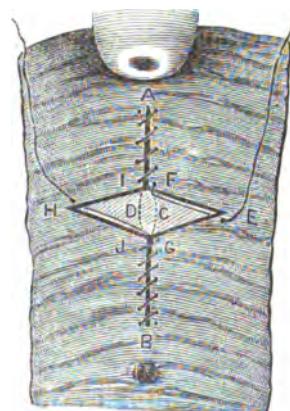


FIG. 3.—OPERATION FOR CYSTOCELE.
(*Annals of Gynaecology.*)

Cystocele and Rectocele—Colporrhaphy.—The numerous operations which have been suggested from time to time for the relief of cystocele have had their day and their earnest advocates, only to give place to improvements and modifications or to entirely new suggestions, which in turn are replaced by others. The procedure suggested by Currier, ^{23, 30} which has for its theory the contraction of the vaginal wall to a sufficient extent, both in length

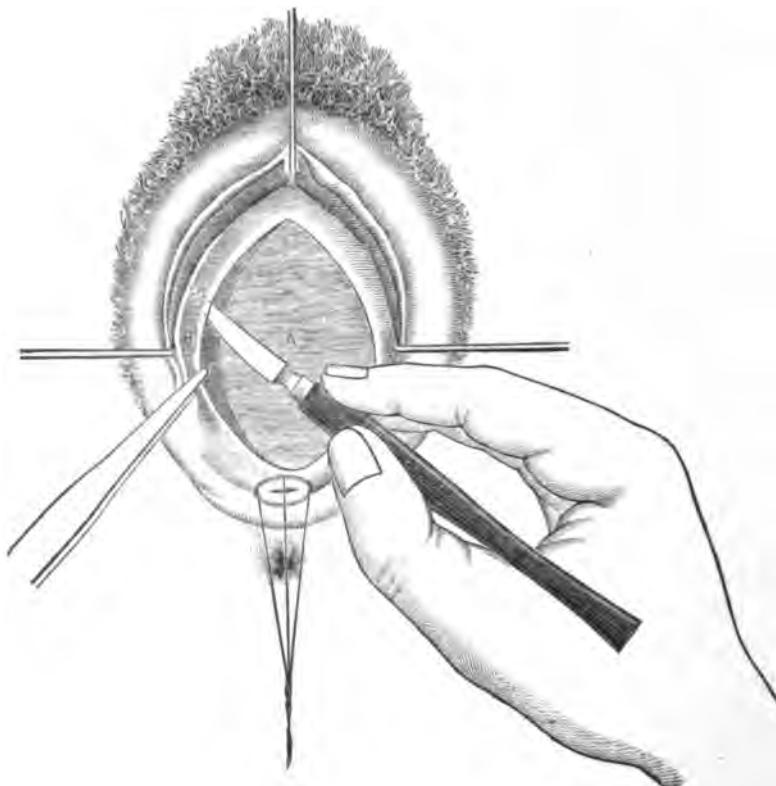


FIG. 1.—ANTERIOR COLPORRHAPHY.
Depression of incisions (A) through edges of detached sides of vagina (B).
(*Münchener med. Wochenschrift.*)

and breadth, thus distributing the tension over two lines of union at right angles to each other, has been demonstrated practically in several instances before the class of the New York Post-Graduate Medical School and Hospital. In performing the operation a sufficiently large ellipse of mucous membrane is removed through the long axis of the anterior wall, and then another through its short or transverse axis at right angles to the first, the patient being

placed in Sims's position, and the perineum retracted by the Erich-Hunter self-retaining speculum. The geometrical figure in the cut does not indicate either the absolute or relative portion of tissue removed, but only the principle involved. It shows the character of the denudation, the manner in which the sutures are inserted, and the result obtained on closure of the wound. F. Winckel ⁸⁴ _{Aug. 4} modifies the operation for anterior colporrhaphy as

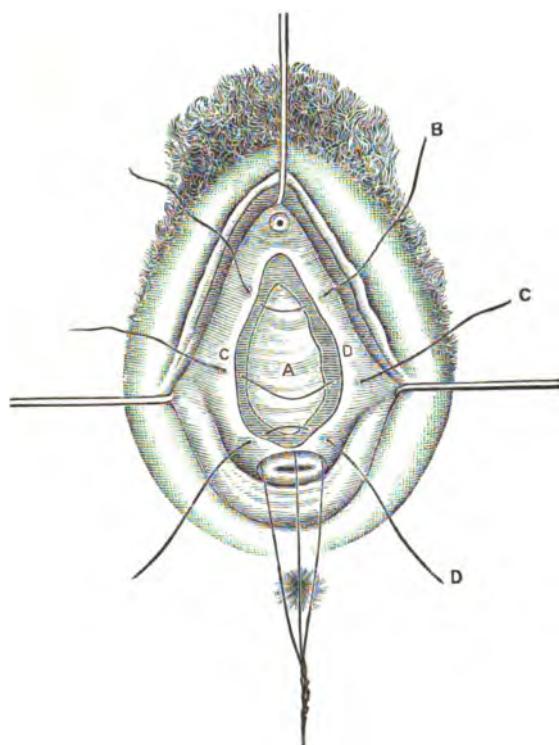


FIG. 2.—ANTERIOR COLPORRHAPHY.
Depression of flap A over flaps B, C, D, the edges E and D being sutured with *fil de Florence* silk.
(*Münchener med. Wochenschrift.*)

follows: None of the vaginal tissue is excised whatever, but he cuts around, as in Sims's operation, a piece of oval shape corresponding to the prolapse of the anterior vaginal wall. He then dissects up the thickness of the vaginal wall from his circular incision outward, as is shown in Fig. 1, while the circumcised flap is left firmly situated in its original position. The deeper tissues are then sutured together by *fil de Florence* threads, and the margins

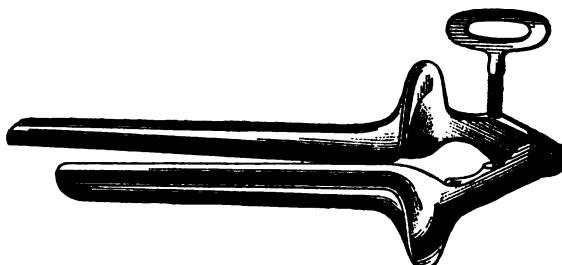
of the dissected mucous membrane are united over the central flap by continuous catgut sutures.

Vaton,⁷⁰ who has made a thorough study of the various methods proposed for the relief of cystocele and its complications, concludes that in simple cystocele either the operation of Stoltz or extra-peritoneal cystopexy is to be selected. In cystocele complicated with urethrocele Emmet's operation is to be preferred, modified, however, by a freshening of the central flap. Where there is a uterine prolapsus it becomes necessary to perform a colposyntomy, together with Alexander's operation, with or without trachelorrhaphy. If there is an associated rectocele Stoltz's operation and a posterior colporrhaphy are indicated, and if, in addition, there is prolapsus of the uterus, Stoltz's and Hégar's operations must be combined.

Hanks,⁴⁹ suggests an ideal operation for the cure of rectocele, growing out of a combination of simple principles as worked out by other men. The sphincter ani is thoroughly stretched, to prevent spasmotic contractions, and then an incision is made from below upward to the summit of the rectocele. The incision is deep at the perineum, nearly down to the sphincter, and only through the mucous membrane above. The tissues are dissected back to the right and left of this median incision for at least an inch to either side. The bases of the flaps are then sutured together at the distal extremity of the wound. "The needle is inserted at the base of the right flap, near the upper end of the dissection, is passed downward toward the rectum, then, turning upward, it passes into and catches the base of the flap; and then, commencing on the opposite side, it catches up a part of the base of the flap, is turned downward toward but not *into* the rectum, then upward again, and the suture is tied." Two rows of deep sutures may be made, then the free edges of the flap must be carefully approximated, held with tenacula, and fastened with No. 1 catgut glover-stitch suture.

Instruments.—A modification of the bivalve variety of vaginal speculum has been made by Mayer and Meltzer.⁶ It may be used either as an expanding instrument or as a retractor, after the manner of Sims's "duck-bill." The joint is of a simple character, and is very easily disconnected, so that it can be thoroughly cleaned. The figures show how one blade of the instrument is

placed at right angles to the other and fixed with a small catch, when it may be used to draw back the posterior vaginal wall.



CONVERTIBLE VAGINAL SPECULUM.
(*London Lancet.*)

VAGINAL SPECULUM.
(*Albany Medical Annals*)

Wm. O. Stillman²¹⁶ has devised two new vaginal specula. The first is a modification of the ordinary bivalve variety, in which the vulvar portion, which is of convenient size, instead of enlarging on opening the speculum to its widest extent, becomes slightly smaller when fully expanded. The upper blade is shorter than the lower one, and, working on a short radius, retracts and exposes the womb very readily. The breadth of the blades increases toward the free ends, in order to prevent the falling in of the relaxed vaginal walls, but when the instrument is shut this increase

in breadth is compensated for by excessive flatness to facilitate introduction. The second speculum is an improvement on the well-known tubular ones, making it more easy of introduction, self-retaining, and giving a greater range of vision than usual.



VAGINAL SPECULUM.
(Albany Medical Annals.)

FISTULÆ.

Uretero-Vaginal.—Schatz, of Rostock, ²² has reported 2 cases in which a ureter communicated with the vagina. The urine from the ureter had a specific gravity of 1003 to 1006, and was of a clearer color than that from the bladder, the specific gravity of which was 1030. The solid matter in the two urines was as 1 to 10, whilst urea was entirely absent from the former. As it was proved that the greater concentration was not due to any absorption within the bladder, it was concluded that the difference was due to the influence of the fistula.

Bandl has made a similar observation, and Campbell ²¹ has cured a case complicating vesico-vaginal fistula by means of division of the uretero-vesical septum.

Vesico-Intestinal.—The air in the bladder in the cases of so-called pneumaturia is believed by Reginald Harrison ^{22, 23} to be invariably due to the presence of a fistulous communication between the bladder and some portion of the bowel. When the hole is of small dimensions attention to digestion and the avoidance of diarrhoea usually sufficed to insure the comfort of the patient; but, where the communication is large or increasing in size, and there is reason to fear that the foul condition of the urine will lead to renal disease, an operation of some kind is indicated. Supra-pubic cystotomy and high colotomy seem to be the preferable operations; laparotomy is unsuitable. According to Cripps, ²⁴ the most of the fistulæ are in the upper portion of the rectum or in the sigmoid flexure. He urges the value of the information to be ob-

tained with regard to the site of the intestinal opening from a close examination of the faecal matter passed *via* the bladder. He also refers to the use of an injection of milk for the purpose of demonstrating the fact of the communication being with the large intestine.

Urethro-Vaginal.—Polaillon^{2,10} describes 2 cases in which an operation for the restoration of the urethral canal was required. In 1 instance the defect was congenital, while in the second case the fistula resulted secondarily to the removal of a stone from the bladder by the vaginal method. I have met with a case in the dispensary of B. F. Baer, at the Philadelphia Polyclinic, in an old colored woman 68 years of age. The fistula was minute, barely admitting a small probe, whilst its orifice was surrounded by a small and very sensitive polypoid mass of granulation. A simple operation resulted in a cure. Heydenreich^{3,11} has reported a case of complete tear of the urethra, with considerable laceration of the base of the bladder, in a young woman of 21 years, following the removal of a vesical calculus. After repeated operations a cure resulted, with occasional incontinence, however.

Vesico-Vaginal.—In support of the theory that calculous formations frequently take their origin subsequent to the closure of a vesico-vaginal fistula, Campbell^{8,1} reports the case of a mulatto woman, in whom persistent calculous elimination and accretion in the bladder continued for many years after vaginal lithotomy and closure of the incision by Sims's operation. When there is a persistent leakage of urine subsequent to an operation for the cure of fistula, he suggests the following causes:—

1. Contraction and loss of vesical capacity, incident either to actual loss of bladder-wall by sloughing or from non-distension by prolonged drainage through the fistula.
2. Irritability of the bladder from cystitis.
3. The presence of calculi in the bladder.
4. The cervix uteri turned into and retained within the cavity of the bladder as an emergency of the operation.
5. The presence of a minute vesico-vaginal fistula, existing at the time of the operation for the principal fistula, but overlooked.
6. The presence of a utero-vaginal fistula.
7. Failure to remove one of the loops of a silver-wire suture.

Trendelenburg ⁸⁴⁴ recommends the employment of his position in operations upon the bladder and in cases of fistula. Bond ⁸² urges the importance of thorough dilatation of the vagina to expose the fistulous opening, and also the necessity of dividing any cicatricial bands which distort the parts and prevent ready access to the fistula, or which might produce undue tension upon the sutures, as was originally emphasized by Bozeman, at the International Congress at Washington.

Frane ²²⁰ has performed the operation for fistula a number of times under cocaine anæsthesia with much satisfaction. The loss of sensibility was almost absolute. J. Price ²³ believes that vesico-vaginal fistulæ are of much more frequent occurrence than is generally supposed, and especially is this noticed in rural districts. He ascribes this frequency of occurrence to the improper use of the forceps.

Cases are reported by Hirst, ²³ in which the cervix was utilized to close the aperture; by Armstrong, ²³⁹ and by Allan, ²⁵⁷ in whose case the fistula was produced by the wearing of a Zwank's pessary for a number of months. Operation was followed by a cure, which was complete in 2 of the cases, but with a slight occasional leakage of urine in Hirst's patient, which necessitated a secondary operation. Baum ²²¹ reports an interesting case, in which he followed Trendelenburg's suggestion to close complicated fistulæ by exposing and incising the bladder as in epicystotomy, and suturing the edges of the fistulæ from within. The patient, being in Trendelenburg's position, a median incision was made just above the symphysis, the prevesical space exposed, and the bladder opened by a transverse incision two and a half inches in extent. The borders of the fistula were denuded, and 8 silk sutures, having a needle on each end, were passed down into the vagina, where they were drawn through by the left hand of the operator, and subsequently tied with the aid of a Simon speculum. The upper wound in the bladder was closed with a double row of sutures. Convalescence was tedious, and, six weeks after the operation, a large fistula remained at the site of the abdominal wound. There also persisted a small cervico-vesical fistula. Bardenheuer ²² closed a large vesico-vaginal fistula, in which the whole of the base of the bladder was absent and also a large part of the uterus, by freeing the bladder on all sides, uniting its walls, and turning them in

toward the front, so that the upper part became the fundus. The operation was a success.

Recto-Vaginal.—Félixet⁴⁸ suggests a new method of cure. He splits the perineum transversely to a point above the fistula. In this way two fistulæ result,—a vagino-perineal and a recto-perineal. The first is closed by sutures, and the latter is opened up through the sphincter and anterior rectal wall in the same manner as for the ordinary fistula in ano. The gases and faecal masses escape through the free opening, and allow the vaginal fistula to close. Sänger¹⁷⁰ divides the true surgical operations for recto-vaginal fistulæ into three classes: (1) methods of denudation; (2) methods of transplantation; (3) methods of flap-splitting. The denuding operation is easily surpassed, both in safety and the certainty of results, by the flap-splitting operations, while the methods of transplantation are only to be applied when the typical operations have failed, or have from the outset been impossible on account of the location of the fistula. In the flap-splitting operation he lays the greatest stress upon the suture introduced and buried beneath the flaps,—a peculiarity which he was the first to suggest in the performance of the operation. Bazy¹⁵² recommends Le Dentu's operation in the treatment of the inferior recto-vaginal and recto-vulvar fistulæ. Fourcaud¹⁸⁸ reports a case of recto-vaginal fistula resulting from the presence of a metallic box in the vagina for a period of nine years. Foley¹ operated on a fistula secondary to an abscess in the anterior rectal wall, after Tait's method, with complete success.

TRACHELORRHAPHY.

The principal contra-indication to the performance of Emmet's operation is, according to Sexton,¹⁰⁰ the presence of any form of pelvic inflammation. Any tenderness or enlargement in the ovarian regions must be overcome before attempts are made to correct the cervical condition. Another contra-indication, he believes, exists in the cases wherein nature has at last healed the tear by the deposit of cicatricial tissue. It is the inflammatory action necessary to produce the cicatrix that begets all the symptoms; the cicatrix formed, the trouble ceases. In cases where both laceration and erosion exist, and yet the local and general symptoms are slight and the condition of the health is comparatively good, the

operation is not indicated, and, in fact, should not be done. He believes that the operation has been brought into some disrepute by reason of failure to pay proper attention to these details, and because of improper preparation of the patient. He regards one reason as sufficient why the operation should not be abandoned, namely, that there is no way in which ulceration of the torn surfaces can be cured so readily. Early operation should be the rule; idly temporizing with other plans of treatment is only to invite septic endometritis, salpingitis, and other complications which, in many instances, justly or unjustly, have been traced to the operation.

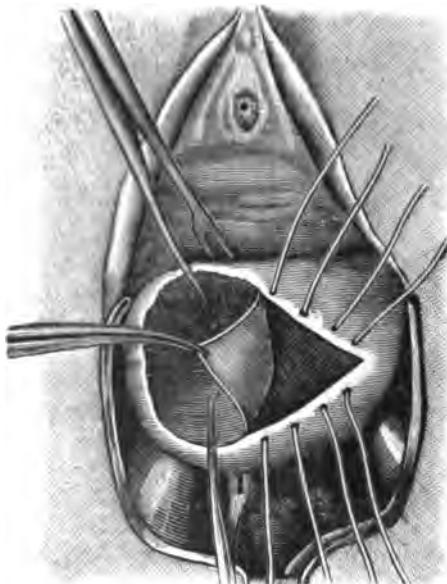


FIG. 1.—TRACHELORRHAPHY.
(*Annales de Gynécologie.*)

Sänger¹⁰⁴ applies Lawson Tait's principle of flap-splitting to the restoration of tear of the cervix, as well as to other plastic operations on the female genitalia. This suggestion, originated by him, has been practiced by Fritsch, Kleinwächter, and Sänger in various manners. Hartmann¹⁰⁵ regards the following as the simplest method: Seizing the anterior and posterior lips of the cervix with very fine forceps, the whole is drawn downward and to the right, in such a manner as to thoroughly expose the left side, supposing the tear to be upon that side. Then, inserting the bistoury into the anterior lip of the cervix, a little in

advance of the limit of the tear, an angular section is made downward from this point, terminating upon the posterior lip of the cervix. The bistoury has progressed through a plane almost parallel to the mucous membrane of the tear, and has circumscribed thus a triangular flap, attached by its intra-cervical base and free at its summit, corresponding to the vaginal limit of the tear. This flap is drawn over by a forceps, fixing its summit toward the cervical canal. (See Fig. 1.) All that remains after this rapid freshening is to place the sutures. It is necessary to commence at the outermost joint, piercing successively

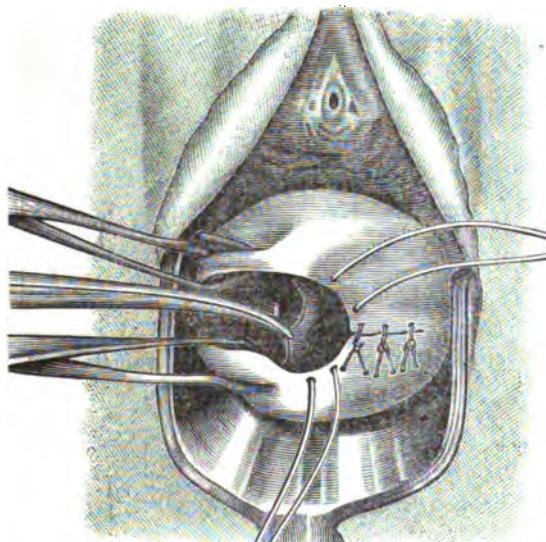


FIG. 2.—TRACHELORRHAPHY.
(*Annales de Gynécologie.*)

with the needle the posterior lip of the freshened surface, the deep face of the flap, and the anterior lip. The two extremities of the thread are knotted from without. (See Fig. 2.) From three to seven sutures suffice to restore the most extensive tears. Before tying the last suture—that nearest to the orifice—it is necessary to ascertain that the permeability of the cervical canal has been preserved. The cervix, which has resumed its normal form, is bordered by a hem, somewhat pinked, corresponding to the apex of the flap. This latter may be resected if it make too much of a projection, and an iodoform dressing applied. Mulheron¹⁰²

earnestly advocates the importance of early trachelorrhaphy, advancing as his argument that the objection to its performance on the ground that sepsis is apt to follow is purely theoretical. He claims that the danger from absorption is in the first place much less in the cervix than in the perineum, the lymphatics being less abundant in the former, and yet no one objects to the immediate repair of the latter from the fear of sepsis. He regards the danger as *nil*, and concludes that the results already obtained furnish not the slightest justification for the fear. The cervix is singularly immune from the danger of absorbing septic matter from wounds in its tissue, and, under proper antiseptic precautions, this danger may be reduced to the minimum. Early trachelorrhaphy is by no means a formidable operation, but, on the contrary, it is exceedingly easy of performance, in which respect it differs radically from trachelorrhaphy involving a removal of dense cicatrices and the passage of the needle through the uterus after involution has progressed nearly to completion. If done before involution has been completed the process goes on, the catgut sutures are absorbed, and the needle-punctures disappear, often leaving not the slightest evidence that the operation has been made. He believes it to be good practice to examine every primipara within two weeks after her delivery for the purpose of ascertaining the condition of her cervix.

Barrows¹, also strongly advocates the propriety of the early operation. He claims that the tears, though they may not be of very great extent, interfere materially with the involution of the uterus, thus making the "getting up" slow and unsatisfactory, and give rise to perhaps one-third of all the cases of uterine disease from extension upward of the inflammation in the parts, and expose the patient to imminent peril from sepsis. In the operation he prefers to use chromicized catgut sutures, No. 5 (violin A). These do not need to be removed, and hence accompanying operations on the perineum will not be interfered with. According to Marcy,²⁰⁰ trachelorrhaphy is greatly simplified by the use of the continuous-tendon suture, applied with the Hagedorn needle. The sutures require no further attention, and a vaginal dressing of iodoform wool, changed once or twice, is the sole care that is requisite. Cases of cure following operation are reported by Dodge¹⁸⁵ and by Ross._{July 22}¹⁹ In the latter instance a

severe gastralgia, which had resisted all treatment, yielded promptly after the operation had been performed.

Instruments.—Duke²⁸ has devised two chisel-shaped knives,—one with rounded edge and the other with a straight edge,—to facilitate the entire removal of the cicatricial tissue in Emmet's operation, and to evenly and properly freshen the angles of the laceration. These knives, not being set in the same way as an ordinary knife, as regards the handle, allow the operator to clear the sides and angle of each laceration accurately, removing just the amount of tissue required for perfect apposition of the surfaces.



NEW TRACHELORRHAPHY KNIFE.
(*Provincial Medical Journal.*)

Duke has also had made a barbed tenaculum, with which he transfixes the apex of each laceration and steadies the part. He then cuts out the tenaculum by a clean cut upward on each side, meeting at the apex, and so removes the two sides and joint in one piece.

PERINEUM.

Protection of Perineum.—The improved obstetrics of the present day, if demonstrated in no other way, is clearly revealed in the notable decrease in the number of severe lacerations of the pelvic floor. It is becoming comparatively rare to encounter complete lacerations through the sphincter, and when seen they are usually of some years' standing. Gardner,¹⁰⁰² who has studied with care the methods for the protection of the perineum, brings prominently forward the principle that time alone is the great perineal protector. He argues that almost any perineum will distend sufficiently to allow the safe passage of the head if only the latter can be prevented from advancing with too great rapidity just during the last portion of the second stage of labor. The two great forces driving the child toward the outer world are the contractions of the uterus and the contractions of the abdominal

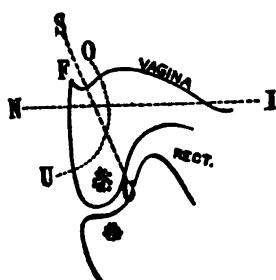
muscles. The former are virtually beyond our control, even by complete chloroform anaesthesia; the latter may be readily controlled by anaesthetics, and in nearly every case without an anaesthetic,—by the will of the patient. She may be educated to control the abdominal muscles by being instructed, as soon as she feels a pain coming on, to immediately open her mouth and breathe through it as rapidly as possible. The inspirations should be shallow, and at least 150 to the minute. By observing this rule, in the vast majority of cases the forces of the abdominal muscles may be entirely eliminated. When this is attained the principal step in the preservation is accomplished. Then, with pressure properly applied by the fingers of the right hand over the perineum during and between the pains, the advance of the head can usually be controlled absolutely and the pressure upon the perineum relieved, so that its circulation may be re-established and its elasticity increased. The perineum must be as carefully guarded during the passage of the shoulders as during the delivery of the head. When the forceps are used, the same practice of giving an abundance of time is the one that saves the perineum. Dougherty⁸⁰¹ claims that he has seldom had a laceration since he has been practicing the Dewees method of preservation of the perineum. E. E. Richards¹⁹_{or 10} advises resorting to gradual dilatation to control uterine contractions, and emptying the rectum to prevent tenesmus. He also allows the patient to assume the lateral position, and thus modifies the contractions by support of and forward pressure of the head; in addition, in cases of long and rigid perinei, he employs an anaesthetic. He says that the sign of danger is the white, triangular, glistening mark along the perineum, and, when this is observed, he immediately makes lateral incisions for a distance of one centimetre at a point corresponding with the tuberosity of the ischium. Leake⁸⁵ considers, as the most important measure toward the preservation of the perineum, the keeping intact, as far as is possible, the bag of water until the floor of the pelvis has been dilated as much as it may be by its benign influence. This care should be supplemented later by deliberation in the delivery of the head and attention to the rotation of the shoulders.

Early Perineorrhaphy.—Richards¹⁹_{or 10} gives, as the contraindications to the early operation, exhaustion due to haemorrhage and a long and difficult labor. When labor is more than twenty-

four hours over the primary operation is useless, and a secondary operation must be resorted to. H. T. Hanks¹ advises operation within four hours. To do this the patient must be on the edge of the bed or on a table, before a good light, and in the lithotomy posture. With the finger in the rectum, so as to judge of the severity of the injury, a needle is then to be passed down to the right and left of the rectum, far enough to catch the fibres of the levator ani muscle. He believes that most of the modern methods of performing these repairs were not successful for the reason that they were simply skin operations, which failed to include the muscles. Robb⁷⁶⁴ is of the opinion that the postural treatment with bound knees, so commonly employed, does not perfectly unite the torn surfaces, and the only proper procedure is to suture them at once, or at as short an interval after labor as possible. If by oversight the tear has existed for several days, it still is not too late for this repair. Plenty of hot water is required, and 1 ounce (30 grammes) of a 10-per-cent. solution of cocaine, if several days have elapsed. The only instruments necessary are a needle-holder, a pair of scissors, a needle threaded with a loop to carry sutures, and perhaps a spoon to hold up the anterior vaginal wall. The after-treatment is of great importance. It is not necessary that the patient be kept in the recumbent posture; she may be allowed to move very gently from side to side, preventing the knees from separating widely. The bladder should be emptied voluntarily, if possible, and, if not, a clean, glass catheter should be used every six or eight hours. The bowels should be opened on the third day by administering one-third of a bottle of citrate of magnesia, repeated every two or three hours, followed, if necessary, by an enema of a pint of warm soap and water. Straining at stool should be avoided. The stitches should be removed in from seven to nine days. Robb, in addition to the ordinary tear, describes two other forms of rupture. The first involves the tissues just in front of the columna, and extends beyond this point, up one or both sulci, into the vagina. It is in the area shown in the figure (next page) above the dotted line, I N. The other form of rupture extends over the whole of the skin perineum, through the sphincter, and a variable distance up the recto-vaginal septum. In the figure it involves that part of the perineum outside of the dotted line, S C. The repair of the first form is similar to the one

already described; the sphincter tear must first be reduced to a simpler form by a series of superficial sutures passed on the rectal surface and tied in the rectum. The remaining tear can then be closed as described.

Gendron,²⁴ says that the primitive suturing of the perineum has become the rule, where formerly it was the exception. He employs an injection of cocaine locally and silver wire for the perineal sutures, and these latter he draws very tightly, to insure exact agglutination of the surfaces after the infiltration of the tissues has disappeared. For the superficial suturing of the skin he prefers Florence hair, and for the suturing on the vaginal side catgut. He is strongly opposed to the usual custom of keeping the bowels unopened. Olivier,²⁵ after applying a solution of cocaine (1 to 10), carefully cleanses the wound with a sublimate solution (1 to 4000). Then, removing the ragged edges with a pair of scissors, he sutures the wound, employing either catgut or iodoform silk for this purpose, and, after a second lotion with the sublimate solution, applies an iodoform dressing. His results have been good. Horn,²⁶ however, reports a case of poisoning following the employment of sublimate solution in an early perineorrhaphy. While the sutures were being inserted, a 1-to-



SAGITTAL SECTION OF POSTERIOR VAGINAL WALL, PERINEUM, AND RECTUM.

The area embraced by O U represents an outside, more or less superficial, tear. The area above I N represents a tear more on the inside of the vagina, and the area outside of S O includes the whole skin perineum and the sphincter ani.

(Johns Hopkins Hosp. Bulletin.)

4000 sublimate solution was played over the wound. On the following day diarrhoea, with fetid, blood-stained stools, set in, with tympanitic distension, nausea, severe headache, and depression. The temperature rose and the gums became sore. On the second day the temperature rose to 106° F. (41.1° C.), but then sank to normal; the urine diminished in quantity, followed by retention on the third day. Treatment consisted in the application of the ice-bag, the administration of opium internally, and the free use of chlorate-of-potash gargles for the mouth. He considers that sublimate lotions should not be used for vaginal injections in midwifery when there is a distinct breach of surface on the vaginal mucous membrane.

Late Perineorrhaphy.—There are certain preliminaries which

Richards¹⁹ ~~Oct. 10~~ declares should be observed in the performance of late perineorrhaphy, in order not only to promote the healing of the wound, but also to insure the formation of a strong cicatrix. The vulva, if the operation be done shortly after parturition, should be allowed to return to its normal condition, and the condition of the general health should be good. Hæmorrhoids, if present, should be treated, and any vaginal or uterine discharge arrested. Olivier²² urges the importance of thorough asepsis, and vigorously opposes the usual custom of retaining the bowels in a constipated condition after the operation is completed. He purges the patient energetically the same evening. A milk diet is instituted at once, and maintained for five or six days, any tendency to constipation being overcome by the use of laxatives. If there be accumulations of gas, a sound is introduced into the anus to a depth of six or eight centimetres several times *per diem*. Richards calls attention to the nervous symptoms which develop at times after operative measures; these include insomnia, fear of impending evil, loss of memory, a dread of approaching insanity, and other symptoms of mental disorder. No explanation as to the etiology and significance is offered.

H. T. Hanks^{20, 21} expressly urges the importance of understanding the function of the levator ani muscle in the treatment of severe injuries of the vaginal floor. No perineal operation for the relief of rectocele will be successful unless the fibres of this muscle, which extend between the rectum and vagina, are brought together by deep lateral sutures. He emphasizes the fact that the sutures must be inserted deep down in the right and left sulcus, in order to restore the parts to their original condition.

Lawson Tait²² divides all of his cases of injuries of the vaginal floor into those of "torn perineum" and "damaged perineum," applying to them severally the operations for "complete repair" and "extension" of the perineum. The principles involved are three: first, that of flap-splitting, being applied to both sets of cases, and, the second, the disinterment of divided structures, being required only for the cases of repair of complete rupture. The third principle, the method of the insertion of the sutures, is common to both. Marcy²³ asserts that nearly all surgeons content themselves by operating upon the vagina after denuding it of its *mucous surface only*; hence the unsatisfactory results obtained in

the vast majority of the cases. He is of the opinion that the true *rationale* of operative procedures and consequent satisfactory result should be based upon making the dissection *behind* the vaginal muscle, and not *upon* it,—a procedure which is both simple and easy. After the posterior third of the vagina is separated from its vulvar attachments, the dissection being carried up the crest of the rectocele and into the lateral sulci as far as is deemed sufficient, sutures are passed deeply, beginning at the base of the dissection. In rectocele with prolapse and large, deep sulci, the buried sutures are more deeply taken, laterally and internally from side to side, in order to join the separate fibres of the levator loop with the retracted transverse perineal muscle. Usually four or five of these sutures, which should be of tendon, are required, the remaining tissues being coapted by light running sutures taken from side to side until all the structures are joined. The use of the buried animal suture he regards almost as a corollary in the problem of aseptic wound treatment. Joseph Price,¹⁰⁰ in a paper read at Washington, before the American Association of Obstetricians, in September, does not think that the various flap operations could be compared with Emmet's last operation for laceration of the perineum, as regards ultimate results. He condemns the old puckering operations as absolutely worthless. McIntyre¹⁰² regards the Bantock operation as the most successful one, while Adams¹² prefers for all conditions Langenbeck's operation, which, he says, might be called a "flap-denuding operation."

Goodell²⁴ asserts that the Tait operation makes the best and most lasting perineum. Von Ott,⁴⁹ however, condemns the Tait, and prefers the operation of Simon or that of Hegar. Harvey¹¹⁵ believes that rectocele is more apt to follow after a laceration of the perineum extending quite to, but not involving the sphincters, than it is where those muscles are rent; and that, excepting the incontinence in the latter, most all other symptoms are more severe in the former class of cases. In operating he urges the free use of scissors in vivifying, in order that every vestige of scar-tissue may be removed, the retracted ends of muscles thoroughly exposed, and the surfaces to be opposed rendered smooth and even. As regards the after-treatment, he advises the application of strictly antiseptic dressings, and, if necessary, a silver female catheter may be carefully introduced along the *posterior* wall of the rectum to

relieve accumulated flatus. The soft-rubber catheter may be used to evacuate the bladder twice daily, care being taken to drop no urine on the wound. Lawrence, ^{280, 281} in complete rupture of the perineum, carefully frees the rectum from its attachments in its abnormal situation, bringing it down and fixing it in its proper place. As a rule, he operates three days after a menstrual period. The bowels are made to act well each day for one week prior to the operation, but no action is solicited on the day of the operation. Cases of operation, followed by perfect results, are reported by Johnson, ²⁹ Wyman, ³³⁹ Groff, ¹⁹ Champlin, ¹⁰¹ and Ross, ²⁹ who applied the flap-splitting method to 6 cases of complete rupture, with entire control of the sphincter ani muscle in each case.

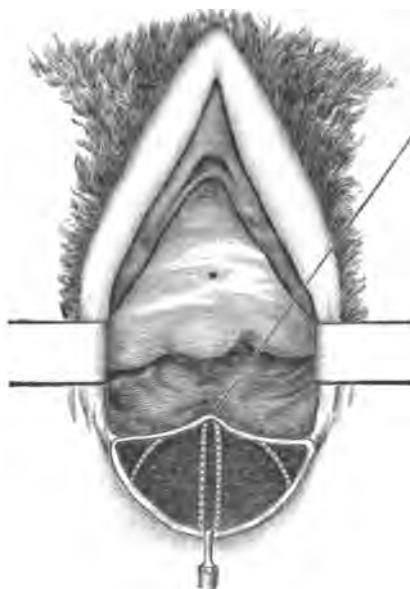
New Methods.—Winckel ⁸⁴ advocates saving all the tissue, even in operating upon the largest defects of the perineum. To do this, he proposes separating the vaginal from the rectal wall, in the form of a semicircular arch, to the extent of four to five centimetres, the incision commencing at the lower end of the labia minora. The centre of the posterior vaginal wall is then pushed up, converting the scythe-shaped wound into a four-sided one, the upper two sides of which are used for lengthening the posterior vaginal wall and the lower two for forming the perineum. One or two rows of buried *fil de Florence* sutures are inserted, filling up the fossa between the vagina and rectum. The external skin contracts readily over these buried sutures, and permanent solid union is obtained. He has performed this operation in place of Hegar's operation in partial prolapse of the uterus with excellent success. Duke ²⁸² has suggested a procedure which, apparently a modification of the Tait operation, is, in fact, quite distinct. The bistoury pierces the tissue in front of the anus, at right angles to the vulva, penetrating the septum for two and a half inches upward, the incision being enlarged laterally to two inches as the knife is withdrawn. The patient is then turned on her side, and, on the joints of incision being pressed together, a lozenge-shaped opening is produced. There is an absence of flaps, the incision is a deep one, and the sutures are introduced from without, a thick and solid perineal body resulting. In addition, there is no loss of tissue whatever. The operation is virtually the same as that proposed by Winckel, and is strongly advocated by Madden. ⁶ C. A. L. Reed ⁵⁸ has modified Tait's operation as regards the

method of suturing. The margin of the upper flap is reefed to successfully close the wound against the vaginal secretion, and the deep stitch is made to avoid the skin in order to loosen the resistance of the skin to the suture in approximating the retracted ends of the torn muscle. The other sutures are passed through the skin to avoid the umbilication which follows if all the sutures are subcutaneous.

Burns¹⁶¹ suggests a method which has the advantage of almost entirely doing away with haemorrhage. A small transverse incision

is made in the median line, and the proximal margin of the tissue is seized by a pair of tissue-forceps and held taut. A small dissecting-knife is pushed rapidly forward, keeping well to the vaginal surface with the point, until the apex of the triangle is reached. A straight, probe-pointed bistoury is then introduced and swept first to one side and then to the other, as if pivoted to the point of entrance; then, with an ordinary sealpel, a curvilinear incision is made from one crus of the angle to the other. It is then drawn from the tension-loop down one side to meet the curvilinear and then down the other, and the triangular flap lifts out. Sutures are then applied.

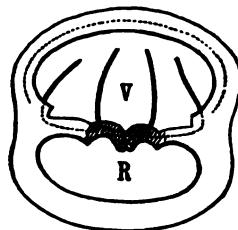
Hanks,²⁰²⁰ in lacerations involving the sphincter ani, instead of denuding and removing the edge of the recto-vaginal septum, as was formerly done in Tait's operation, splits the septum for one-half inch, thus producing two flaps of one-half inch each, or a full inch altogether, with which to repair this portion of the lesion. His success, he claims, is excellent. In complete tears of the perineum and recto-vaginal wall, Doléris¹⁹⁴ traces with the bistoury a margin along the entire length of the tear, from the summit of the angle to the anus. He then dissects up this margin toward the tear, draws the free edges together, and sutures them.



NEW PERINEAL OPERATION.
(*Pittsburgh Medical Review*)

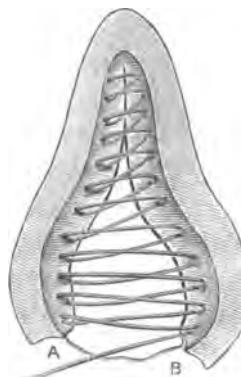
(See figures.) There is thus formed on the rectal side a longitudinal ridge, where the freshened surfaces of the vaginal mucous membrane come together. The operation is then completed by the ordinary procedure of Simon-Hégar.

Sutures.—Ott⁴²² advances what he calls a “complete method of application and removal of sutures in normal perineorrhaphy.” He considers that perineorrhaphy “normal” in which the parts which rightly belong together are brought in apposition. He places the sutures in tiers, in order to avoid the formation of pockets. In complete rupture the lowest tier consists of short sutures applied close to the rectum, but not piercing its mucous membrane, the sutures being tied toward the wound. The next tier brings the surfaces of the wound together, as does also the third, which also unites the mucous membrane of the vagina and skin of the perineum.



COLPOPERINEORRHAPHY.
V, vagina; R, rectum.

(*Bulletin de la Société Obstétrique et Gynécologique.*)



DOLERIS'S METHOD OF
TRACHELORRHAPHY.

Both of the deep tiers are buried. The superficial tier should be removed as soon as union of the margin of the wound takes place; this may be readily accomplished if one end of the thread is left long, and a thin platinum wire is included in the sutures, laid lengthwise on the posterior vaginal wall. If made tense and heated by electricity, the sutures are cut through and may easily be removed by pulling on the long end. Boulton² urges the employment of the purse-string suture in complete perineal rupture, claiming that by it the sphincter ani was more perfectly restored than by other methods of suturing.

Harvey¹¹⁵ prefers braided silk, as does also Mayfield.⁵² Reamy and Johnson⁵³ have used silk-worm gut with very much satisfaction.

Instruments.—Watkins¹¹⁵ has devised a perineal shield which is made of hard rubber, and which protects the line of suturing



PERINEAL SHIELD.
(*Western Medical Reporter.*)

from the irritation produced by the dripping of the urine. It renders catheterization and douching after urination unnecessary.

DISEASES OF PREGNANCY.

By WALTER P. MANTON, M.D.,
DETROIT.

STERILITY.

Lindner²¹⁴⁰ discusses the subject of Malthusianism under three heads,—Malthusian children, men, and women. "Accidental children," he finds, do not differ physiologically or psychologically from those the fruit of normal intercourse,—that is, where no checks have been employed. Parents, on the other hand, as the result of such practices, not infrequently suffer from severe forms of general and sexual neurasthenia, which may be followed by hysteria, hypochondriasis, epilepsy, and various psychoses. Malthusian males are those who, without actually abstaining from sexual intercourse, do not produce children to the extent of their capacity; while Malthusian women are defined as those who, by the employment of checks before, during, or after intercourse, seek to regulate conception at pleasure. The effect of this practice upon national growth, whether considered from an ethical or economic point of view, is most pernicious. In 1888 it was found that, of ten million French families, two millions had no offspring, while two millions more had but one child,—the result, it is supposed, of Malthusian practices,—one-fifth, therefore, being sterile. According to the last State census, Massachusetts shows a similar condition of affairs,—one-fifth of the married women in that commonwealth being childless.

Lemner¹⁸⁸ considers that the prevention of conception is but little elevated above the moral plane of abortion; the moral degradation accompanying the exhibition of preventives, as compared with that condition of mind going with an abortion, would be, to an intelligent woman, as almost equal conditions to a given end. Robert Bell²² believes that the one great factor in sterility is endometritis and endocervicitis, and that, if the normal condition of the endometrium is restored,—it matters not how long

after marriage, provided the woman is still within the age of fecundity,—impregnation is likely to take place.

Chéron¹⁴⁸ states that latent blennorrhœa in man is a frequent source of infection of the genitals in woman, and the resulting endocervicitis, cervometritis, or endometritis, with affection of the adnexa, is a frequent cause of sterility. This sterility is not irremediable, either when due to endometritis or when a tubo-ovaritis is present. Removal of the appendages is not permissible under the pretext that a woman is certainly sterile, except in old cases; for we have no means of proving that all hope of conception is absolutely lost.

Forster¹⁴⁹ reports a case where the sterility was probably due to a hypertrophic elongation of the anterior uterine lip, which, during coitus, was possibly forced backward, and thus occluded the os. The general subject of sterility has been considered by Iomileff,²²⁶ Kay,²²⁷ and McKee.²²⁸

FERTILITY.

Brem²²⁹ publishes some interesting figures in regard to multiple births, which occurred in 10,000 cases in the Budapest Clinic between 1869 and 1887. Of the total number, 130 were multiple, —127 twins and 3 triplets, *i.e.*, 1 twin in 78 births, 1 triplet in 3333 births. Of 252 twins, 133 were boys and 119 girls; 43 times both children were boys (34.13 per cent.), 36 times both were girls (28.57 per cent.), and 47 times there were both sexes (37.3 per cent.). In 1 case the sex could not be determined. Of the mothers, 25 per cent. were I-paræ and 75 per cent. multi-paræ. The placenta was double in 56 cases (50 per cent.), 2 chorions, 2 amnions; in 29 cases (26.36 per cent.) there were 2 united placentæ, 2 chorions, 2 amnions; and in 25 cases (22.72 per cent.) the placenta was single, 1 chorion, 2 amnions. Of 248 twins, the head presented 168 times (67.74 per cent.), the breech 73 times (29.43 per cent.), and 7 times (2.83 per cent.) the presentation was transverse. The average weight of the children was 2353 grammes (426.7 ounces); the length, 46.06 (17.65 inches) centimetres. The mortality of the mothers, 4.72 per cent.; the morbidity, 33.33 per cent. Vassali¹³⁰ saw a woman in the fourth month of pregnancy whose abdomen had reached the size at term. The patient aborted, and in the course of a few hours was delivered

of six foeti, the combined weight of which was 1730 grammes (3½ pounds); the largest weighing 305 (9½ ounces), the smallest 250 grammes (8 ounces). Their length varied between 22 and 26 centimetres. The placenta was single, large, and adherent, and had to be removed piecemeal. Bentlif² saw a case of abortion of triplets, and von Bazzanella³¹⁷ reports a similar case, in which one foetus was alive the other two F. papyracei.

Herzfeld¹⁴ observed a III-paræ, aged 33, who was normally delivered of a child. After labor, the abdomen still appearing large, examination revealed the presence of a second living foetus outside the womb, the uterine cavity being perfectly empty. The patient was moved to a hospital, cæliotomy performed, and the child (now dead) extracted. The funis was attached to the uterine adnexa. This case was considered to be one of true ovarian pregnancy, from the fact that the right tube presented no solution of continuity; the adnexa of the left side were entirely normal and the uterus empty. According to the recently published investigations of Arthur Johnstone,³² an ovarian pregnancy is not only improbable, but impossible. Contrary to the accepted opinion, he finds that the ovum is sustained by the transuded lymph of the mother which is found in the adenoid tissue subjacent to the lining of the womb and the Fallopian tubes, the only other place where this lymph is furnished being the peritoneal cavity. In a case of extra-uterine pregnancy complicating normal pregnancy, and operated on during the seventh month by Worrall,²² at the Sydney (N. S. W.) Hospital, a foetus, weighing 4½ pounds (2236.80 grains) and 19½ (49.53 centimetres) inches long, was removed from the abdominal cavity. Miscarriage followed the next day,—the child perishing, but the mother making a good recovery.

Pregnancy Following Hysteropexy. — Fraipont²³⁶ reports 3 cases. In 2 there was premature confinement; the other went to term. Labor and puerperium normal. In 1 case there were sharp pains in the cicatrix during the first half of pregnancy, but later the pain was not continuous, and could be easily borne. In 1 case retroflexion has returned; in another there is an approach to retroversion, while in the third the uterus remains in normal position.

Sanger's statistics show³¹⁷ that 8 operators have performed

ventro-fixation 111 times. In 20 cases the adnexa were preserved; and in these there followed 9 full-time births, 2 abortions, and 2 pregnancies. He believes, therefore, that his operation is preferable to others, because, while it fixes the uterus anteriorly, it also allows of normal motion. On the other hand, Schucking ³¹⁷ reports 23 cases of full-time births and 217 pregnancies following vaginal ligature. He claims that the operation is free from danger, reliable in results, and does not tend to disturb subsequent pregnancies. In this he is supported by many of the leading German operators. Leopold ³¹⁷ adds another to the 2 cases already reported from his clinic by Sperling, ³⁰ in which pregnancy followed hysteropexy, with delivery at term. In a case reported by Gottschalk ³¹⁷, the patient aborted in the third month, and it was found that the anterior portion of the uterine wall was thickened, but that the posterior wall was so thinned that, had the uterine distension not been relieved, rupture would probably have taken place.

Late Pregnancy.—Depasse ³⁷⁸ gives the history of a woman, aged 59 years 5 months, who was delivered of a healthy male child, which she suckled, weaning it on her sixtieth birthday. The patient had been a widow for twenty years, and had ceased to menstruate nearly ten years before. One physician had thought the enlarging abdomen to be due to a fibroid; another had diagnosed ovarian cyst, and arrangements had been made to operate. McNees ⁸⁵ reports the case of a woman, aged 39, who, after twenty-one years of sterile married life, gave birth to a healthy female child. In a case seen by Bevill ⁵⁰, impregnation had taken place through a hymeneal slit one-eighth of an inch in length. The patient had had imperforate hymen, which had been incised to allow the escape of retained menstrual fluid. Operation was successfully undertaken during the seventh month of pregnancy. A somewhat similar incident is reported by Mlle. Mesnard. ²³⁶

Time of Impregnation.—From a series of observations on the wives of sailors, and following artificial impregnation, Bossi ¹⁶² concludes that the most favorable time for impregnation is immediately following menstruation. He finds that the spermatozoa, contrary to the general supposition, retain their vitality in the vagina for at least seventeen days, even through a menstrual period.

Nubile Age of Females in India.—In a timely and interesting

article, Boyle Chunder Sen²³⁹ presents a strong plea for legislative enactment advancing the age at which Indian girls may marry. He shows that, although menstruation may occur somewhat earlier in Indian girls than in those of Northern countries, this is not attributable to climate, but to premature sexual excitement, the result of luxuriance and the association of betrothed children. Of 21 labors among such girls reported by Chunder Shone, tedious though natural delivery took place in 5, forceps were used in 5, and there were 11 still-births. The delay in these cases was due to the absence of regular and forcible uterine contractions and the undilatability of the imperfectly developed sexual organs. Early child-bearing is very fatal to the child-mothers, the drain upon the immature system being so great that if labor does not terminate fatally a large number of the girls succumb sooner or later to its effects. Of the 21 cases noted, 2 had fever and continued weak; 5 died after the second or third labor from pernicious anaemia, after prolonged suffering from fever and diarrhoea; and 2 succumbed to phthisis. The effect of precocious conception on the offspring is marked, many falling victims to a variety of diseases during infancy, and those surviving to adult age being physically and mentally enfeebled. Smyth²³⁹ also pronounces against the custom of child-marriage, and shows its deteriorating effects upon the Indian race.

PREGNANCY.

Signs of Pregnancy.—In a clinical lecture, Jewett²⁴⁰ points out that no one sign in the early months can be taken as positive indications of the presence of pregnancy, but that it is by marshaling all the diagnostic facts that the greatest certainty can be reached, and this is possible only by precise and orderly methods. Until recently the so-called corpus luteum of pregnancy has been supposed to indicate that impregnation had taken place. Hirst showed that this was not a fact, as corpora lutea, identical with those of pregnancy, are found in the non-gravid female. Robinson²⁴⁰ has further studied this question in the ovaries of man and animals, and agrees that it is unjustifiable to elevate the corpus luteum to a medico-legal aspect in distinguishing pregnancy from non-pregnancy. The yellow body may arise before rupture of the Graaffian follicle, and acquire its distinct convolutions. The size of the follicle may be the same four months as sixteen months after labor,

or it may be a mere cicatrix two months after labor or even before. Lowman¹⁷⁸ states that a sure sign of pregnancy is the presence of two teats under the tongue. These are about the size of a No. 4 shot, and are attached to a slender cord in which a nerve runs, connecting with the genital centres (!). In the non-pregnant these prominences are pale, but in the gravid they are of a purplish-red color. Freund¹⁷⁹ finds that the thyroid gland is permanently enlarged by continued energetic irritation of the uterine muscle. This enlargement is a constant manifestation in pregnancy, being due, probably, far less to the influence of the nervous system than to the changes in the circulation.

Duration of Pregnancy.—Oliver¹⁸⁰ is of the opinion that, as in the case of the lower animals, the term of human pregnancy is variable, and that the date of delivery can be but approximately fixed. His method of determining the time of delivery is to find the date of the cessation of the last menstrual period, and then the duration of the usual intermenstrual rest, in each individual case. The number of intermenstrual days is then divided by two, and it will be found that the two hundred and sixtieth day from the middle of the intermenstrual period will most probably be the date of confinement.

Forecasting of Sex.—Lauer,¹⁸¹ from careful study of the subject, states that the parent who displays the greatest degree of sexual appetite during intercourse "is the one unto whom the unborn child will be likened." Ross,¹⁸² from many years of observation, finds that if the motion of the child is felt oftenest on the maternal left side the child is usually a male, while if on the right side it will be a female.

Pseudo-cyesis.—Mayham¹⁸³ saw a 73-year-old woman who claimed to be pregnant, and was afterward said to have been delivered of a child. The vomiting, peristalsis, and flatus, due to alcoholism, in a case reported by Hauck,¹⁸⁴ was supposed to be caused by the pregnant state. Haultain¹⁸⁵ records 3 cases of pseudo-cyesis. In the first no cause could be found; in the second there was cancer of the uterus; while in the third there was a small fibroid growth in the anterior uterine wall. The origin of the condition he attributes to nervous influences, the phenomenon being a purely muscular distension of the abdomen. Other signs are not so easily explained, but these may also be due to nervous

origin. In a case reported by Clay¹⁸⁹ the condition was due to ascites; in another, Whitehead⁴³ found all the symptoms of pregnancy present, but with a tympanitic abdomen and a uterus smaller than normal.

Retention of Urine.—Lloyd⁷⁸⁶ was called to a case in which the cervix so pressed against the urethra that a catheter could not be introduced, and the bladder had to be punctured above the pubes to relieve the distension and threatened uræmia. As the cervix could not be passed by a bougie, the fundus was punctured and the liquor amnii drawn off. Abortion resulted, but the patient made a good recovery. The uterus was then found to be fixed by firm adhesions.

Sudden Blindness in Pregnancy.—Hosch²¹⁴ reported to the Medical Society of Basel the case of a woman in the sixth month of pregnancy who awoke, one morning, blind. The pupils were fixed, there was no retinal hæmorrhage, the papillæ were but slightly reddened, and there was no albumen in the urine. Eight or ten days later spontaneous premature labor took place, followed by a gradual improvement in the sight. No theory as to the cause of the sudden blindness was advanced. As the result of experiments on mice, Vicarelli⁹⁴³ found that the absence of light had a tendency to cause early abortion, but did not otherwise modify the course of pregnancy. If the mother was kept in the dark during pregnancy the development of the offspring was most retarded; the retardation was less marked if, after birth, the offspring were no longer kept in the dark; and least in the case of those kept in the dark after birth, the mother having passed pregnancy in the light. The highest degree of development was obtained if the mother and offspring, after birth, lived in the light.

Missed Labor.—Lutaud²⁴ is of the opinion that this is by no means a rare accident; that, while generally expelled, the foetus is not always thus gotten rid of. The symptoms accompanying retention vary with the age at which death occurs. If during the first two or three months of pregnancy, the embryo is quickly absorbed; during the second period of intra-uterine life the foetus becomes atrophied, mummified, or desiccated, and turns gray or yellow in color. Death occurring after the fifth month is followed by maceration. In this case if no air is admitted decomposition is slow, and gas, odor, and cadaveric discoloration are not developed.

Thomas¹⁸⁰ saw a case in which foetal movements ceased one month before the predicted end of gestation. The patient was delivered seven months later,—six months after predicted date of confinement. Parkinson² reports a case in which the intact membranes and placenta were carried fifteen months after conception. No trace of the foetus could be found, and it had probably been absorbed. Batchelor² delivered a dead foetus four weeks after the normal time for labor. Preuschen³⁴ induced abortion in a case which failed to fall in labor on the normal date, and delivered a mummified foetus sixteen centimetres long. The placenta contained evidences of an old haemorrhage. Macan² exhibited before the Royal Academy of Medicine, in Ireland, a foetus which had been retained three months after the normal termination of pregnancy. Goclet¹⁹² reports the retention of a foetus and secundines for four months, during which time there had been persistent and, at times, profuse haemorrhage. McDonald showed the Toronto Medical Society³⁹ a foetus that had died during the third and been expelled during the fifth month of pregnancy.

Surgical Interference During Pregnancy.—The question of surgical interference in cases of abdominal tumors complicated by pregnancy is one of the greatest interest and importance, and has been a subject of extensive discussion. The opinion of those competent to judge seems to be that in all cases new growths which seriously affect the health of the mother, or are liable to give trouble during labor or the puerperium, should be treated by surgical means, provided, of course, that such would be admissible in the non-parous state. According to Gördes,³⁹³ new growths in pregnant women are infrequent. In Martin's Hospital, in 330 laparotomies, but 4 per cent., including ectopic pregnancies, were upon pregnant women. In 16 cases of surgical operations (abdominal), on gravid women, the left side was affected in 50 per cent., the right side in less than 25 per cent., both sides in more than 25 per cent. Ectopic pregnancy (75 per cent.) and inflammations of the tubes and ovaries are more frequent on the left side, but pathological conditions of the kidneys occur oftener on the right side. Myomata complicating pregnancy are rare, as they usually prevent conception and are apt to cause abortion (submucous and interstitial varieties).

Oliver¹⁸⁷ reports the case of a 45-year-old I-para, who aborted in the fifth month of pregnancy, the result of uterine fibroids. Myomata in the upper uterine segment are not so likely to interfere with labor. Operations may be undertaken when the growth is pedunculated; if sessile, non-interference is recommended as long as there is no compression of the uterus. The diagnosis between non-pedunculate and subserous and interstitial tumors is impossible. When the symptoms are not very urgent the patient can wait, and Cæsarian section be performed later if necessary. If the entire tumor can be removed, Sänger's operation is preferred; otherwise, the Porro. In cases of malignant growths, Gördes thinks that the tumor should be removed regardless of the child. Sutugin⁵⁰ states that scarcely one-fifth of all cases complicated by fibroids terminate without surgical interference, and about one-third of the mothers and one-half of the children die during or soon after delivery in consequence of the morbid growths. Operations during early pregnancy give better results than those undertaken later, and enucleation *per vaginam* should be elected when possible. The importance of early interference is illustrated by the case of a negro woman, under the care of Watkins,⁶⁴⁷ who suffered from rupture of the uterus, the result of a myomatous condition. Death was sudden, and was preceded by convulsions. A small dermoid cyst was removed by Fenger¹⁰⁰² in the fifth month of gestation, without interrupting the pregnancy. Landau⁴¹ exhibited a uterus which he had removed at term for multiple myomata. On account of the low position of the tumors, neither Cæsarian section nor Porro's operation could be done. Both mother and child (8½ pounds) survived. Jonas¹⁰⁶ removed the uterus from a woman in the fourth month of pregnancy for adeno-carcinoma, with favorable results. Abortion had taken place three weeks previously. In a pregnant fibroid uterus, exhibited by Parks before the Chicago Gynæcological Society,²¹⁴¹ one tumor was submucous and pedunculated and a second mass lay high up under the liver. Chadwick⁸⁹ saw a case, six to eight months pregnant, operated on by Bradford, in which a multiple fibroid uterus caused obstruction of the bowel. Supra-vaginal hysterectomy was done, the patient dying on the eighth day from peritonitis. In a case of severe extra-peritoneal hæmorrhage during pregnancy, Bontor⁶ performed section in an attempt to save the child. The mother succumbed to the loss of blood.

An interesting case of gunshot wound of the pregnant uterus is reported by Bradley.⁷⁷⁹ The patient, a colored girl aged 20, shot herself with a 32-calibre revolver, with suicidal intent, the bullet entering to the right of and on a line with the umbilicus. Laparotomy was performed several hours later, and the abdomen found filled with blood and clots. A bullet wound existed in the right side of the uterine fundus, just anterior to the attachment of the Fallopian tube. This was closed by three Lambert sutures, the abdominal cavity flushed with hot water, and the external wound united by silver-wire sutures. Drainage was employed both in the median line and in the bullet wound. The patient aborted a six months' foetus the same evening without untoward symptoms, and made a perfect recovery. The foetus had a bullet wound just behind the acromion process of the right scapula; another just above the umbilicus; and the right leg was shattered just below the knee. The bullet was not found. Lodewijks⁷⁸⁰ opened the abdomen for supposed ectopic pregnancy, but found the uterus normally pregnant, the tumor proving to be a hæmatosalpinx of the right side, together with a small ovarian cyst. Traces of a chorion were supposed to have been found in a clot. The patient was delivered at term,—six months later. In a case of *placenta prævia*, Fancourt Barnes⁷⁸¹ opened the abdomen and removed 5 hydatid tumors of the omentum. The patient miscarried four months later. Florintine²⁰² hastened a threatened abortion, and in less than a month later successfully removed an ovarian tumor weighing 40 pounds.

ABORTION.

Sectional Anatomy of Early Abortion.—In a communication to the Obstetrical Society of Edinburgh, Berry Hart⁷⁸² concludes, from the exact study of a specimen presented, that (1) the muscular wall of the lower portion of the uterus is thinned out in abortion so as to give a lower segment, which is as well marked in the aborting uterus as in the uterus in labor at full term; (2) the peritoneum over this part of the uterus becomes loosened, as the result of the expansion of the muscular wall; and (3) the decidua over the same area is separated, also, from the same cause.

The medical and surgical aspects of abortion are set forth by Thalberg,²⁷⁵ in a paper read at the third general meeting of Russian Medical Men. She states that both in Russia and in Western

Europe criminal abortion is exceedingly common, and its baneful results are manifested in the health of the people. The chief causes which lead to this are defective moral and mental education of women and their ignorance of the criminality of abortion, especially of its harmful effects on their own health. An indirect, but nevertheless powerful, cause of the spread of abortion practice is found in the defective sense and principles of those members of the medical profession who render assistance in such matters.

Causes.—Schuhl,⁴⁸ states that, while the causes of habitual abortion are very numerous, but two unquestionably predominate, viz., retroversion and syphilis. Syphilitic origin may be either maternal or paternal; the latter should always be suspected when frequent abortion takes place in a woman whose pelvic organs are healthy. Walbridge¹¹⁵ believes uterine displacements to be the most potent cause. Chronic lead poisoning in the father is also mentioned as a cause.

Leith Napier² concludes that congestion of the uterus is a more important factor than retroflexion. Mackenzie⁶ reports a curious case of premature delivery associated with rupture of the liver. A single woman aged 19, and probably five or six months pregnant, while romping with her lover and another girl, sat down in a chair, the back of which rested against a dresser. While in this position, the man threw his companion with great force against the patient, who immediately exclaimed, "Oh, my back!" and fainted. Three days later the patient miscarried, and died on the day following. The autopsy showed a laceration of the posterior margin of the liver, with escape of bile into the upper peritoneal cavity. Mackenzie compares this to the "buffer accidents" of railroad-men. Bunge³¹⁷ saw a woman who had inserted a hair-pin into the uterus to bring on abortion, but was unable to extract the instrument. The abortion took place on the following night. Twelve days later she experienced pain in the hypogastrium, associated with painful micturition and a slight discharge of blood from the genitals. Examination revealed the hair-pin presenting at the internal os; its removal was followed by the disappearance of all symptoms. Poynz²³⁹ attended a case of abortion caused by the extraction of a tooth thirteen days before. Labor was immediately preceded by severe haemorrhage from the dental alveolus.

Sequelæ.—Brownlee¹³⁸ saw tetanus follow abortion at the

fourth month. The patient did well until the seventh day, when trismus set in, and she died, during a convulsion, fifty-four hours after the onset of the disease. No cause for the convulsions could be found. A small piece of placenta had been retained for two hours; the os uteri was rough and granular. The treatment consisted in keeping the patient under chloral hydrate, nearly 3 ounces (93 grammes) being administered, in doses of from 60 to 100 grains (3.89 to 6.48 grammes), during a period of forty-two hours. Fenwick²⁷ reports a case of hemiplegia following abortion. A portion of the placenta was adherent, and the cervix had been dilated with tampons to facilitate its removal. Later, the patient's mouth was found drawn to the right side. Sensation was not impaired, but articulation was imperfect. Pain, fever, and headache were absent. Under rest, the bromides, and iodides, the patient gradually recovered, and was able to walk about the room on the twentieth day. Glasgow²⁸ describes a case of nodular enlargement of the left breast in a patient who had recently aborted, and had afterward suffered from haemorrhage. The uterus was curetted of its softened endometrium, and from the time of the operation the mammary tumor began to lessen in size, and finally disappeared. In the case of a prostitute aged 18, in whom abortion was followed by septic endometritis, salpingitis, and general peritonitis, Dorsett²⁹ opened the abdomen and found an abscess of each ovary.

Treatment.—In threatened abortion von Brehm, of Riga,²¹ relies upon large doses of opium, hot applications to the abdomen, and rest. Werder¹⁶¹ indorses the opium treatment and adds the bromides, stating that these are the only remedies in which confidence should be placed. *Viburnum prunifolium* he believes to be utterly valueless.

Arnstein² prefers administering the tincture of opium in lukewarm water by the rectum, giving 15 drops (Ph. Ross.=1 to 10 of the drug) every hour. Pregnant women, he says, bear opium well, and a considerable quantity of the drug may therefore be given. Bedford Brown⁵⁶ favors the subcutaneous injection of $\frac{1}{4}$ grain (0.016 gramme) of morphia, with $\frac{1}{60}$ grain (0.0018 gramme) atropia. Where there is much haemorrhage with depression, $\frac{1}{60}$ grain (0.0018 gramme) of strychnia with 20 minims (1.3 grammes) of fluid extract of ergot should be given. If the haemorrhage continues, a douche of hot water containing potassium

permanganate, and later alum,—1 ounce (31 grammes) to the pint ($\frac{1}{2}$ litre),—are recommended. This is followed by packing the vagina with iodoform gauze. If these fail the uterus is dilated and 3 drachms (11.66 grammes) of ergot are injected into the rectum. Chazan⁵⁷_{Mar. 15} finds that, in cases where no indications for active interference exist, the vaginal tampon is sufficient. Iodoform gauze is the best material for this purpose, as it is both anti-septic and slightly styptic. When uterine contractions have ceased, the detached products of conception will generally be found lying in the cervical canal or behind the tampon. When the vaginal tampon is insufficient, the cervix may also be packed. In retained placenta after abortion Sanborn⁵⁴⁷_{May} relies on the expectant method, believing that nature is competent to deal with such cases. Velits⁵⁷_{Mar. 8} concludes, from the study of 4333 cases in Tauffer's clinic, that only when there are decided indications, as in atonic bleeding, should retained membranes be removed from the uterine cavity. Tags hanging from the cervix should be detached by the finger or the polypus-forceps. In removing the ovum von Brehm, of Riga,²¹_{p. 7, '90} considers the finger of little account, preferring a modification of Martin's polypus-forceps. Crowell,⁹_{Apr. 3} Long,¹⁹⁶_{Apr.} and many others favor the curette.

Induced Labor.—Pinard⁴⁸_{Jan. '90} discusses the question of induced premature labor in cases of pelvic deformity, and advises the student not to rely upon the ordinary measurements, but upon what he terms the "*palper mesurateur*"; that is, a direct comparison of the size of the child's head with that of the pelvic cavity. This is done by bringing the foetal head over the superior strait and by maintaining it in the position which it would assume in normal labor, determining with the examining finger whether, when pressed against the promontory, the head projects over the symphysis. To secure a living child in contracted pelvis, the pregnancy must be advanced at least seven months, and the C. V. must not be below nine centimetres. Violence in delivery must be avoided and normal dilatation and regular labor promoted, the child being passed through the pelvic canal as rapidly as possible. Taubert⁸¹⁷_{Oct. 3} insists that the induction of premature labor has great advantages over Cæsarian section in all cases where the relative indications are for the latter. Donath³⁶_{Sept.} reports a case successfully treated by Prochownik's method (ANNUAL, 1891, vol. ii, I-8).

Gräfe³¹⁷, advocates the induction of artificial abortion in those cases of constant or repeated hæmorrhage during pregnancy which, from their severity, are liable to result in chronic anæmia.

Schrader suggests a new method of exciting uterine contractions. Alternate streams of hot and cold water are sent into the vagina, by means of a glass nozzle attached to a T connected with two tanks. Twenty-four litres (24 quarts) of cold and 12 litres (12 quarts) of hot water are used, the fluid having a fall of one and one-half metres. This should be repeated every hour and a half until labor sets in. The perineum must be depressed after each douching, in order to allow the water in the vagina to escape. About 2 litres (2 quarts) of cold and 1 litre (1 quart) of hot water are used at each irrigation. Of 18 women thus treated, and 4 more partially so, all but 1 recovered without drawback. Seventy-five per cent. of the children born were alive. Balandin⁴⁶ considers the bougie—Krause's method—one of the most uncertain and tardy, sometimes requiring several weeks before uterine contractions are set up, and frequently producing no effect. The more vigorous the antisepsis, the less efficacious is the bougie; but, on the other hand, it never gives rise to febrile reaction or complications. Stanton²⁷ considers Krause's method the safest, surest, and best.

Solowjow,⁴²² after rendering the vagina and cervical canal antiseptic, packs the latter with four cotton tampons, the size of a pea, which have been soaked in iodoform ether. On the following day these will be found in the vagina. After douching with 1-per-cent. creolin solution, five tampons are placed in the cervical canal up to the internal os. In twenty-four hours this packing is replaced by a strip of iodoform gauze, which is left for another twenty-four hours. The uterus and cervix is then filled by fresh tampons, and in a few hours pains set in, a flow of blood occurs, and the ovum is expelled. Treub¹⁰⁰⁴ employs a condom, into the neck of which a soft-rubber tube is tied. By means of a celluloid cannula, the condom is introduced into the uterus and distended by borated solution injected through the tubing. When the condom is full the tubing is tied, the cannula withdrawn, and a pad of iodoform gauze placed against the cervix. Delivery is usually effected in thirty-one hours. For I-paræ Treub recommends the cervical tampon of iodoform gauze.

HYPEREMESIS GRAVIDARUM.

Not much that is new has been added to our knowledge of this subject, but the animated discussion between Ahlfeld³¹⁷ and Kaltenbach³³³ has awakened renewed interest and shed some light on a condition the etiology of which is still obscure. Both of these authorities agree that the pernicious vomiting of pregnancy may be, and frequently is, the result of a reflex neurosis. Keil³⁴ supports the theory, and a case is recorded by Alt,³⁴ which well illustrates this. A highly hysterical woman, in the sixth month of pregnancy, suffered from grave vomiting, and was anxious that miscarriage should be induced. While preparing to enter a hospital for general treatment for the relief of this condition, her eldest child was taken with pneumonia. The mother, abandoning all thought of self, nursed the child back to health; but, from the moment that she began her self-sacrificing service, she ceased to vomit and remained well until the termination of pregnancy. MacKinnon's experience leads him²⁷ to accept the views of Graily Hewitt that uterine displacements are the most frequent cause of vomiting, and he resorts to packing the vagina with absorbent cotton, in order to raise the displaced organ. Goelet¹³² relieved a case by the use of glycerin tampon and a 10-per-cent. solution of ichthylol. Fischel⁸ saw 2 cases of incoercible vomiting in the same newly-built house, and suggests that the damp walls and moist ground may have had something to do with the condition. Cases of vomiting due to mole-pregnancy have been reported by Helmsing²¹ and Lander.² Peyre¹⁸⁸ states that hydatid moles occur about once in 20,000 pregnancies. He records a case in which the patient flowed nearly two months, with occasional interruptions, small clots accompanying the discharge. The increase in the size of the uterus was very rapid. The patient, who was much emaciated by the accompanying vomiting and ptyalism, made a speedy recovery after the uterus had been evacuated. Friedreich pointed out as early as 1878 that the vomiting of pregnancy was a neurosis, and recommended large doses of bromide as the best treatment. Cohnstein³¹⁷ has had success with this drug, but admits that, while the disease may at first be of purely nervous origin, it quickly passes beyond a treatment of mere sedatives alone. I saw a case in the second month of pregnancy, which improved under the bromides, but succumbed a week later from exhaustion.

Wertheimer found that the bromides of potassium, sodium, and ammonium acted favorably in a case on which the potash salts alone had but little influence. Pombrak⁵³⁰ considers iodine, 2 to 3 drops, three times a day, in boiled water, almost a specific. Kaatzer⁵³¹ records permanent success from the following combination:—

R. Creasote,	30 minims (1.94 grammes).
Tr. gentian,	2½ drachms (9.62 grammes).
Ex. coffee (German Pharm.),	2½ drachms (9.62 grammes).
Brandy,	1 ounce (30.00 grammes).
Distilled water,	3½ ounces (105.00 grammes).

Sig.: Shake well. Teaspoonful in milk, two or three times a day.

Blackwell¹⁹ found the old treatment of application of strong nitrate of silver to cervical erosions efficient in 2 cases, while Armand Routh²² has had uniformly good results from painting the cervix with iodine paint (p. e. iodine, iodide of potash, spts. wine and water). A somewhat novel cure is mentioned by Tureaud.¹⁸⁸ It consisted in rubbing the patient's body briskly until the skin was deeply reddened,—with a towel dipped in hot water,—and then placing her in a wet-pack for one minute. The process was repeated once a day as required. Baraduc²⁴ has seen the vomiting controlled by the administration of Châtel-Guyon water.

The question of operative interference in this condition is one of the greatest importance. Fruitnight²⁷ very pertinently observes that we must have neither preconceived opinions to sustain nor prejudices to cherish, but must base our decisions upon the peculiar merits viewed from every side of each individual case. The consensus of opinion seems to be, that when every other method has been tried and found wanting, and the mother's life is endangered by the severity of the condition, artificial abortion or labor should be induced. Cases have been presented by Bennett,¹⁰² Ward,⁹ Blume,¹⁶¹ Dickey,⁷⁶⁰ and Merveille.³⁷⁸ Bezugloff⁵³² introduced a bougie into the uterus for the purpose of bringing on abortion, with the immediate result of stopping the vomiting, the pregnancy going on to term.

ANTE-PARTUM ECLAMPSIA, ALBUMINURIA, AND NEPHRITIS.

Writing on the clinical bearings of nephritis in pregnancy, Fehling⁹⁶ states that, in a total of 2008 placentæ, 326 (15 per cent.) showed white infarcts where no albuminuria was

present. In 73 cases having albuminuria, the infarcts were found in 41 (56.1 per cent.), thus indicating the frequent association of these morbid conditions. The effect of the combined conditions on the development of the child proved to be most disastrous, since of 27 cases, 11 children only were born at term, the remainder being prematurely expelled. In nephritic cases the placenta appears small, compact, thin, and anæmic. The encroachment of the infarcts diminishes the functional activity of the placenta, the fœtus dies from want of oxygen and nourishment, and is expelled prematurely. Three forms of albuminuria of pregnancy are described. In the first the albuminuria is of long duration, and disappears after labor. Cardiac complications are absent. In the second (Leyden's disease), besides albumen, hyaline and granular casts are present, especially toward the end of pregnancy, and at this time there is a tendency to convulsions. In the third, Senator's arterial sclerosis exists; in exceptional forms the changes in the renal vessels are not apparent, the decidual vessels being affected and causing the death of the fœtus. In another group are placed those cases of chronic parenchymatous nephritis which existed before pregnancy, but develop into an acute attack as the result of the condition. The symptoms are œdema, the presence of large amounts of albumen and casts in the urine, retinitis, and bleeding from the nose and other organs. The exacerbation is due to the inability of the heart to perform the extra work put upon it, as well as the circulatory disturbances in the kidneys.

Schuhl,²³⁶ from an analysis of molar pregnancy, in which albuminuria occurred in the early months of utero-gestation, while in normal pregnancy it usually appears at a later period, concludes that there is some obscure relation between albuminuria and hydatid degeneration of the chorion.

Buscarlet²³⁸ reports a fatal case of this nature, death ensuing from haemorrhage and the renal disease.

Rouvier, of Syria,²³⁹ saw a case of twin pregnancy which developed an intermittent type of fever on the ninth day post-partum, due, no doubt, to malarial poisoning so frequent in that country. On the thirteenth day delirium and mild convulsions ensued, followed by death. The fatal termination was attributed to some interference with cutaneous respiration.

Charpentier, of Paris,¹⁰ describes 2 cases of nephritis in which the development of albuminuria was very insidious, no indication of its presence appearing until the forty-fourth day after delivery. Although the patient had repeated chills, there were no symptoms pointing to the uterus or adnexa. The temperature varied from 35.6° to 41° C. (96.1° to 105.8° F.), while the pulse ran from 100 to 128 beats per minute. Not until the fifty-fifth day did the urine become clearly albuminous, and this was preceded by dyspnoea.

Winter²³⁴ reports a case in the fifth month of pregnancy in which profound uræmic coma was followed by six slight convulsions and paralysis of the right leg and arm and left side of the face. Spontaneous miscarriage was followed by death.

MISCELLANEOUS COMPLICATIONS.

Lungs.—Raven²³⁵ reports a case of pneumonia occurring in a I-paræ aged 32 several days before the completion of natural pregnancy. Labor was terminated by forceps. The child was healthy and the mother recovered. Mann⁶ had a case in which labor came on thirteen days after the occurrence of the rigor which ushered in the pneumonia and four days after the crisis in the disease. During the delivery the patient became deeply cyanosed, but was relieved by bleeding from the cord. Childbed was normal and a good recovery was made in six weeks. In a case of pulmonary œdema secondary to nephritis, Anthony²³⁶ found that hypodermatic injections of nitro-glycerin gave the quickest and most lasting relief.

Barras²¹³ describes a case of pulmonary embolism occurring at the onset of parturition. The patient was seized with great dyspnoea and precordial distress, which became much worse after a natural though tedious labor, the patient dying very shortly afterward.

Heart.—Remy¹⁸⁴ concludes, from his studies on the subject, that, if grave complications arise during pregnancy in cases of heart disease, it is best to induce labor very early; but that no rule can be laid down, as much depends upon the individual case. It must be borne in mind that in this condition cardio-pulmonary complications not infrequently set in on the third or fourth day after labor. The fatal event is sometimes sudden,—as during work,

dancing, or getting up,—but more often it follows systolic phenomena.

In 15 cases collected by Remy, 7 were delivered by Cæsarian section or version. When the mother died from slow asphyxia due to asystolism, the death of the child probably preceded that of the parent. In cases of sudden death the chances are that the child is living, and may be saved by prompt action on the part of the physician.

Tetany.—Jaksch¹¹³ saw an interesting case in a woman 35 years old. The spasms first appeared before a menstrual period when she was 19, and re-occurred during her first pregnancy, eighteen months later. The second and third pregnancies were free from the disorder, but it re-appeared during the fifth. The case was essentially chronic, and seemed to be due to some disturbance associated with strumous glands, dyspnœa, pregnancy, and lactation.

Dakin²,₁₄ reports a case of tetany in pregnancy in which the spasms did not completely relax during the three days' course of the disease. In a case observed by Hienricius,³¹⁷_{Aug. 15} tetanus followed abortion, the infection being transferred by a physician and midwife, who had had under their care a child which died of trismus nascentium.

Vaginal Enterocèle.—A rare case of this condition is reported by Hirst.⁹_{Apr. 15} The patient had been pregnant fifteen times, with three premature deliveries. At the last labor, ten years previously, a large tumor was suddenly protruded from the vagina. After delivery the tumor disappeared, and was manifested in the following years by a consciousness only of its presence a day or two before each menstrual period, when it came down a little. In her sixteenth pregnancy she was brought to the hospital, having a pulse of 140 and a slight elevation of temperature; the bowels had not moved for three weeks. The urine was high-colored and contained pus. A tumor projected from the vulva, measuring two inches antero-posteriorly and one and one-eighth inches transversely. With the fingers in the vagina and rectum, the tumor had the characteristic feel of a hernia, the impulse on coughing being distinct. The presentation of the child at labor was by the knee, and, as the body descended and the head entered the pelvis, the tumor protruded from the vagina to an enormous extent, and

distended the right side of the pelvic floor and perineum. The tumor was pulled aside during extraction of the head. The subsequent course of the case was satisfactory, the tumor diminishing in size, but remaining in position.

OBSTETRICS.

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ANTISEPTICS.

Hégar^{24, 1} has made an exhaustive investigation of the statistics of the grand duchy of Baden, to discover, if possible, the value of antiseptics as used in obstetric practice. He finds that during the last forty years the mortality among women during the three weeks following labor has not materially varied in that country. He observes that the obstetricians are divided into two parties, one of which believes in the doctrine of antisepsis and uses antiseptics in abundance, considering the internal surface of the vagina and the cervix uteri as an operative field which should be disinfected before parturition, the other attaching very little importance to self-infection, and occupying itself in removing poisons actually present in or upon the genital organs. Adherents of the latter doctrine limit themselves to the strictly necessary introduction of fingers and instruments into the vaginal canal. In Hégar's opinion, the latter method is the preferable one. The statistics in question show that the use of antiseptics in obstetrical practice has not diminished the mortality from infection in women attended by midwives, and the number so attended is far greater than the number attended by physicians. The use of antiseptics requires the introduction into the genital passage of instruments which are too often the media for the transmission of pathogenic organisms. It would seem that a step in the right direction would be the requirement that midwives abstain from making injections and vaginal examinations in cases in which the parturition is proceeding normally. Careful observation of the pulse, the temperature, the respiration, the frequency of the uterine contractions, and the practice of external palpation, if necessary, should give a midwife sufficient information as to the necessity of calling in a physician to her assistance. The latter is a point of great importance, and

instruction in this direction should be more systematic and thorough than has been the custom heretofore.

Verchère, of Paris,^{303, 99} on the other hand, is not satisfied with the antiseptic management of labor cases, and advocates the following measures: Beginning four weeks before the expected date of labor, his patient is required to have twice daily a vaginal injection of a 1-to-1000 sublimate solution. In the last week, however, the injection is ordered only once in two days, the patient, in the intervening time, having a tampon of iodoform gauze placed in the vagina. When the pains begin the tampon is withdrawn and a vaginal examination made. If everything promises a normal labor, a fresh tampon is placed and allowed to remain in the vagina until pushed out by the head. On the completion of the labor the vagina is washed out with sublimate and a tampon again inserted, which is changed the next day, but thereafter every other day, and finally every third day. An iodoform or sublimate compress is also kept over the vulva.

Axmann^{24, 1} has been at the head of the Maternity at Erfurth for the past thirty years, and, in commenting upon his experience during that period, he places himself in accord with a considerable number of German accoucheurs, who regret the mishaps that have arisen from the abuse of corrosive sublimate and carbolic acid in the treatment of parturient women. At the Erfurth Maternity a pregnant woman who is to be examined is first bathed and then receives a vaginal injection of water. Student midwives are not permitted to make examinations until they have familiarized themselves with such procedures by practice upon the manikin. Corrosive sublimate and carbolic acid are regarded as toxic agents too dangerous for use in inexperienced hands. The results of such careful training have been excellent. Of 1187 gravid or parturient women who have served as means of instruction at this Maternity, only 46 have shown a temperature above the physiological level. The good results of this careful training are also seen in the practice of the midwives after they have left the Maternity.

The above about illustrates the disaccord which exists on the subject of antisepsis in midwifery. The truth, as in everything, probably lies between the two extremes. Verchère's recommendations are doubtless based on an exaggerated idea of the importance of strict measures; but, as pointed out by C. M. Green, of

Boston,⁹⁹ they involve one principle of value,—infrequency of vaginal examination during labor. Every time the examining finger touches the patient the possibility of infection is increased. With increasing skill in abdominal palpation the necessity for internal examination progressively diminishes, and with it also diminishes the possibility of septic injection. Leopold and Pantzer, of Dresden,⁹⁶ have shown how much may be learned by external palpation with the practiced hand, and how greatly internal examinations may thereby be restricted. They have further demonstrated by statistics that in proportion as the number of vaginal examinations diminishes the percentage of fever-free convalescences increases. A great point will be gained when it is fully realized that the danger of infection lies not so much in the patient as in the attendants; when it is learned that much of the energy displayed in disinfecting the patient should best be directed to subjective asepsis. Then the parturient woman will be subjected simply to the cleansing bath and to the single corrosive douche at the beginning of labor, and to the occasional bathing of the external genitals with an antiseptic solution during and after the labor. But the greatest possible care will be expended by medical attendant and nurse on their hands, instruments, and utensils brought in contact with the patient; vaginal examinations will be made as infrequently as an intelligent management of labor will allow, and thus will the frequency of puerperal infection steadily grow less.

Notwithstanding the earnest plea of Hiram Corson,⁹⁸ who adduces Traill Green's testimony, based on fifty years' practice, to the effect that there is no need that country physicians should take the precautions against germs, the recognition is steadily gaining ground that the exigencies of practice *demand* attention to antiseptic precautions in midwifery, not perhaps in the manner advocated by enthusiasts, but in that accepted by men who are willing to consider broadly all sides of the question independently of all prejudice. "We attend," says J. C. Reeves, of Dayton, Ohio,¹⁰⁰ "all kinds of cases,—suppurating wounds, erysipelas, scarlet fever,—and are present at post-mortems. Not so very long ago the current doctrine was that a practitioner should withdraw from obstetrics while attending such cases. It is the doctrine no longer. No length of time destroys septic poison. Antiseptics destroy it imme-

diately and surely, and, when circumstances compel, the physician can go, without hesitation or anxiety, from any of these cases to the conduct of a labor, having first conscientiously used the means which late research has placed at his disposal."

Among the articles written on the subject may be mentioned those of J. Lucas Championnière, ²¹² who furnishes an able condensation of the various antiseptic precautions observed in the different hospitals of Paris; Giuseppa Roncaglia, of Modena ⁵⁹⁹; T. A. Dickey, Middletown, O. ⁵⁸; J. W. Bovee, of Washington ⁸¹; Tarnier, of Paris ¹⁶⁴; W. H. Ribble, of Wytheville, Va. ⁸¹; Budin, of Paris ¹⁴; E. Pynchon ¹⁰⁰⁸; H. Stapfer, of Paris ¹⁷; N. Charles, of Liége ²⁵⁶; I. S. Hileman, of Pittston ⁷⁷⁷; L. S. Burchard, of Oakland, Cal. ¹⁴⁷; and A. Dixon, of Henderson, Ky. ⁵⁸.

Of marked interest is the report of the Boston Lying-in Hospital, ¹⁰⁶ which contains a review of its history. It plainly shows how that institution—for years a hot-bed of sepsis—has been so absolutely freed from puerperal fever as to render possible the absence of the name of this disease in its report. The lessons taught are: (1) that carbolic acid, in the weak solutions that it is safe and practicable to use in obstetrics, is entirely unreliable as an antiseptic; (2) that routine vaginal injections during the puerperal period are unnecessary, and may increase the danger of septic infection; (3) that having taken proper precautions to make aseptic everything that comes into contact with the parturient canal during or after labor, the let-alone policy is the proper one to pursue in the absence of special indications for interference. It cannot be positively known that all the details now practiced are essential to the prevention of septic infection,—much of Lister's original plan for the antiseptic treatment of wounds has been found to be superfluous, and as the antiseptic spray has been abandoned in surgery, so it may be that the antiseptic pad will be abandoned in obstetrics by those who now follow its use as a matter of routine,—but it is fair to presume that the Boston Lying-in Hospital will be slow to abandon even the smallest feature of a method that has accomplished such marvelous results.

As a disinfectant in midwifery, Pée ⁹⁹ recommends a 1-percent. solution of lysol, his experience of its use having been very

favorable. It is especially suited for midwives and nurses on account of its safety, cheapness, and convenience.

ANÆSTHESIA.

Mental Influence. — Lefour, of Bordeaux, ²³⁹ read before a recent meeting of the Société Obstétrique de Paris a case where premature labor could be induced by mental impression, as appeared at first sight, by suggestion. The patient had a rickety pelvis; she had been unable to walk till she was 3 years old. Her first labor, which occurred at term, was lingering, and the forceps had to be applied; convalescence was complicated by phlegmasia alba dolens. He determined in the future to induce labor at the eighth month. The patient became pregnant six times. On four occasions premature labor occurred spontaneously a few hours after Lefour had announced his intention (never expressed "until the last moment") of inducing labor next day. The date of the last period was always carefully noted; in one pregnancy the date of conception was easily settled, through special circumstances. The two remaining pregnancies ended by premature delivery felt about the time of quickening. The patient was always in great dread of labor after her first experience, and had signs of a slightly deranged intellect. Lefour traces the spontaneous labor to her extreme impressibility. He denies that the phenomenon was due to suggestion, even auto-suggestion. He had observed an hysterical patient, easily hypnotized, who could not be prematurely delivered by hypnotization, nor could labor be brought on by that process even close upon term. No doubt the opinion of a psychologist of authority would be necessary to decide as to whether the spontaneous induction of labor was not due to suggestion rather than to impression in an excitable patient. The distinction is certainly subtle. The effect was not due to will, as the patient, on moral grounds, always wished that labor could proceed to term, though she dreaded the consequent dangers.

Hypnotism. — F. Fraipont, of Liège, ^{239, 90} reports a successful confinement during hypnosis. The patient was a primipara aged 29, whose confinement came off very much earlier than expected. Labor began at 3.30 A.M. on January 25th last, and at 5 o'clock Fraipont and Delboeuf were sent for. An examination was made, and the os found to be the size of a five-franc piece and the presen-

tation normal. Delbœuf hypnotized the patient by making pressure on the eyeballs, and suggested that she should sleep. The patient, who had previously been greatly agitated, now became calm, and the labor proceeded naturally, the pains returning every three or four minutes. At 8 o'clock the os was as large as the palm of one's hand, and the head was beginning to press on the perineum. Then the pains began to be weaker, shorter, and at longer intervals, and it looked as if the labor would not be completed naturally. The patient seemed to be profoundly hypnotized. Delbœuf now tried if he could influence the contractions of the uterus by suggestion. He suggested that they should return every four minutes. Immediately the pains came on as suggested, and the patient bore down as directed while each contraction lasted. By 9 o'clock the dilatation was nearly complete, but Fraipont, having to keep an appointment elsewhere, the case was left in Delbœuf's hands. Just then the patient began to waken, complaining of a pain in her throat; her uvula seemed swollen, probably as a result of vomiting when her labor began. At 11 o'clock Fraipont returned. In his absence, the pains seeming to slacken again, the midwife had got the patient up, and induced her to walk about, etc. The patient was still awake. Having put her in bed again, Delbœuf once more hypnotized her, and suggested contractions every three minutes, that the patient should continue to sleep and bear down, to help herself, at each pain. The contractions, which had been sluggish, once more returned, regularly every three minutes, and the patient pushed energetically. At 1 o'clock the confinement was complete, the child having been born at 12.30 P.M. The perineum was absolutely intact. Delbœuf now awakened the patient. She could hardly credit that she had been confined, and could remember nothing except the trouble with her throat. She made an excellent recovery, during which Delbœuf and Fraipont made some experiments as to the influence of suggestion on the lacteal secretion and the lochial flow. They found that both could be markedly affected.

An interesting case, in a girl of 14 years, is also reported by G. C. Kingsbury, of Blackpool.² The youth of the patient and her stunted growth made the case an especially difficult one. The labor progressed satisfactorily, without the least suffering being experienced, the patient remembering absolutely nothing. Kingsbury

advises any one who wishes to test this method to have at least six preliminary sittings, so as to accustom the patient to the process, and also to thoroughly test to what degree of hypnosis he can bring her. He is quite sure it will not succeed in every case, but, whenever a woman is known to be susceptible to hypnotism and to exhibit anæsthesia, he thinks it will be justifiable to try this plan if circumstances warrant any interference at all with natural functions. Two further cases are reported by J. Luys, of Paris, ²⁴ _{Dec. 21, '90} who has already done considerable work in this direction.

Anæsthetics. — Chaigneau, of Paris, ²⁴ _{Apr. 19; June 27} ¹ has made a comparative study of all the anæsthetic agents which have been employed or experimented with in parturition. As yet antipyrin has only given moderate results. Chloral has the disadvantage that it must be taken in large doses to be of much value, and then is apt to irritate the stomach and intestines. Chloroform presents so many advantages that it is surprising that it is not used more frequently. It has no particular action upon delivery, upon the production of post-partum hæmorrhage, or upon the occurrences which usually follow labor. It is indicated in all cases in which the pains are severe, cases in which there are irregular contractions of the uterus, spasmodic contraction and rigidity of the cervix, great resistance of the perineum, and badly-tolerated uterine pains. The only contra-indication to chloroform is the tendency to syncope. Acute or chronic affections of the lungs and disease of the heart, kidneys, or nervous system ought not to be an objection to the use of chloroform to a prudent physician. Cocaine has only recently been used in obstetrics, but it may prove of service in diminishing the pain at the time the head is traversing the vulvo-vaginal canal. Jeannel asserts that he has had good results with a 5-per-cent. solution, which he has applied on cotton to the cervix, the vaginal *cul-de-sac*, and the walls of the vagina. The tampon is allowed to remain a few minutes, and is then replaced by another, and this in turn by a third. Doléris has used a 4-per-cent. ointment of cocaine upon the cervix with advantage. Auvard and Secheyron have injected 15 to 20 minims (0.90 to 1.25 grammes) of a 5-per-cent. solution into each labium majus a few minutes before delivery, and it resulted in the complete suppression of the severe pain usually observed at that stage. Chloroform is by far the preferred anæsthetic this year, the few articles written on anæsthetics all repre-

senting earnest appeals in its favor. Lord, of Omaha,¹⁰⁶ recommends chloral, except when cardiac weakness is present.

PLACENTA PRÆVIA.

According to modern ideas, the placenta is said to be *prævia* when it occupies the lower uterine segment, *i.e.*, the portion of the uterus situated below the line of firm peritoneal attachment, which is subject to passive dilatation in the canalization of the utero-vaginal passage. It is the stretching of this portion, and not, as formerly supposed, the dilatation of the *os uteri* alone which detaches the placenta. The ensuing haemorrhage is derived from the opened uterine vessels, and not, to any extent at least, from the placenta.

It is now accepted, says Wm. T. Lusk, of New York,⁸⁵ that the time to act is at the occurrence of the first haemorrhage. It is not right to leave the patient to the chances of a fatal result from haemorrhages occurring when no trained assistant is available, or to allow her strength to become exhausted before active aid is rendered. Delay in the interest of the child means too often the sacrifice of both lives. But even if the sentimental issue alone is considered, there is little question but that a premature child has a better chance of survival than one the mother of whom has had repeated and copious losses of blood.

If the diagnosis of placenta *prævia* has once been made, ascertain the extent of the cervical dilatation. If the cervix is closed, thoroughly disinfect the vagina and employ the tampon. There is little risk of infection if a colpeurynter, rendered aseptic, is employed to distend the vagina. In the absence of the colpeurynter iodoform gauze can be used. At the end of eight hours the tampon should be removed and the vagina irrigated with a 1-to-3000 corrosive-sublimate solution. By this time the cervix is, in most cases, dilated sufficiently to permit the introduction of two fingers; with this degree of dilatation, version should be performed by the Braxton-Hicks method, and an extremity of the child be brought down into the vagina. The rest can be left to nature if the pains are good. Where they are defective, slight traction should be made on the extremity, sufficient to check haemorrhage. The body of the child acts as a most efficient tampon, and the results of this plan have proved most satisfactory as regards the mother's safety. Of course the infantile mortality is large, scarcely more than one-third of the

children having been extracted alive. But a study of the statistics by the older methods show scarcely better results.

The only competitive plan for the one just sketched is that of Barnes. In his address before the British Medical Association, he summed up his experiences and recommendations as follows: 1. Rupture the membranes. 2. Apply a firm binder over the uterus. 3. A plug may be used to gain time, but it must not be trusted; watch closely. 4. Separate all the placenta that adheres within the lower zone, and observe closely. If no haemorrhage, wait awhile; the uterus may do its own work; if not, dilate the cervix by the water-bags. Again pause and observe. If nature fails to deliver, we resort to the forceps—which gives the best chance to the child—or turn. Murphy reported, at the Obstetric Section of the Tenth International Medical Congress, 40 cases treated by this plan, with the loss of two maternal lives and the saving of 50 per cent. of the children.

Lusk thinks that neither plan should exclude the other. Both have immensely reduced the mortality of placenta prævia. The choice should be somewhat determined by the individual aptitudes of the operator. Barnes's plan probably requires, for successful execution, a greater degree of obstetric experience and manipulative skill.

Wyder^{331 161} condemns the present plan of treatment by tamponing carried out by most practitioners, *i.e.*, tamponing of the vagina with subsequent internal version and rapid extraction of the child, and in its stead recommends the combined version method employed by most German clinicians, first recommended by Braxton-Hicks, and indorsed by Schroeder and Gusserow. According to Wyder, the disadvantages of the first method are: 1. The haemorrhage from the opened uterine sinuses will not be prevented with absolute certainty by the tamponage. The latter is, moreover, contra-indicated after rupture of membranes, because of the danger of concealed haemorrhage. 2. Very great danger of septic infection is associated with the manipulations incidental to the method, and this danger cannot always, even with the observance of the strictest antiseptic precautions, be avoided. 3. Rupture of the lower uterine segment inevitably follows the attempt to make rapid extraction at once after turning. 4. The haemorrhage occurring during the third stage of labor, and the manual separa-

tion of the placenta which is thereby necessitated, together with the ill consequences which often follow, constitute a further group of serious symptoms. 5. Still another disadvantage of the tampon method is the enormous loss of time which the busy practitioner will sustain, because of the necessity of exercising most careful vigilance during the treatment.

All these disadvantages are avoided by the Braxton-Hicks method, inasmuch as by means of the early rupture of the membranes the further separation of the placenta is prevented, and the natural tampon—the breech of the child, which has the additional advantage of being completely aseptic—forestalls any haemorrhage. Schroeder aptly and impressively describes the method when he says: "Rupture the membranes and bring down a foot." If the breech presents this will be a simple matter; not so, however, if the head or shoulder presents, for in this case version must be made, in order that we may be able to reach a foot, and, because the os uteri is yet small, version must be practiced as it is described by Braxton-Hicks. Having turned the child and brought down a foot, the expulsion of the child should be left to nature as much as possible. Only circumstances immediately endangering the life of the mother or child furnish indications for rapid extraction. Separation of the placenta by the hand should, if possible, be avoided.

In performing version, Wyder recommends insertion of the operating finger into and through the placental mass when the os is completely occluded, while at the same time the other hand is engaged pressing the respective part of the child toward the finger entering the placenta. The haemorrhage caused by the injury thus done the placenta is of small quantity and little importance. The principal objection heretofore offered to this method regarded the great mortality percentage of the children. Wyder correctly points to the very materially diminished mortality rate of the mothers in antithesis. The mortality among mothers with the old plan of treatment in vogue reached 30 to 40 per cent., whilst the statistics of the clinics of Schroeder and Gusserow, as well as the various polyclinics, show a mortality percentage of 6 to 7 per cent. with the method of combined version. The mortality among children reached 50 to 70 per cent. with the old method, not including the 30 to 40 per cent. of the survivors who died within a fortnight

from insufficient vitality, whilst the new method can show almost as good a record with 70 to 80 per cent. of deaths.

Lomer,² after a series of 27 cases of placenta prævia, treated successfully by combined version without immediate extraction, reports a case of death from rupture of the uterus. The head was in the first position, placenta to the left, the cervix dilatable and almost effaced, and the uterus tense. Violent pains set in after version, and two hours later, when the child had been expelled spontaneously as far as the navel, the uterus ruptured. The laceration began apparently at the placental site and extended transversely, nearly separating the uterus from the vagina. Lomer believes that a partial rupture took place during the turning, and was rendered complete by the subsequent violent pains. This experience leads him to doubt the safety of the expectant treatment as a routine practice in placenta prævia.

S. F. Zimin, of Moscow,^{2146 109} contributes a valuable paper on the subject, based on reports of 16 Russian (7 St. Petersburg, 4 Moscow, 2 Kazan, 1 Warsaw, 1 Ekaterinburg, and 1 Perm) lying-in homes for the period of 1845 to 1890. The essential points of the statistical inquiry may be summarized somewhat as follows: 1. The average percentage of cases of placenta prævia in Russia amounts to 0.267 (of the grand total of 117,897 labors, it occurred in 315), the proportion in individual hospitals oscillating between 0.023 and 3.906 per cent. Comparatively with Germany the percentage is very high, the average figure deduced from statistics of nine German authors being as low as 0.14 per cent. 2. In multiparæ it was met with nearly eight times as frequently as in primiparæ (88.7 per cent. against 11.8). 3. It is observed most frequently in women aged from 35 to 40. 4. Hard-working women seem to be especially liable to it. 5. A lateral placenta prævia occurs thrice as frequently as a central one (78.9 per cent. against 21.1). 6. Labor sets in most frequently in the course of the tenth lunar month, then in the ninth and eighth. 7. In 75 per cent. of the cases the head presentation is discovered, in 12.5 the breech, and in 12.5 the transverse. 8. As to the issue, 18.1 per cent. of mothers and 63 of infants die, while 71.9 of the former and 37 of the latter survive.

In a practice of twenty years, J. B. McGaughey, of Winona, Minn.,¹⁰⁵ met 12 cases of placenta prævia in 10 different patients,

all except 1 being multiparous. The uteri of 7 of the multiparæ having previously been lacerated, leads him to consider laceration as one of the important elements in the causation of the anomaly. M. Herzog, of Cincinnati, ⁵⁸ ascribes to the hydrostatic pressure in the interior of the gravid uterus a most important rôle in the production of the pathological conditions in *placenta prævia* and especially early hæmorrhage.

Floël, of Koburg, ⁸¹⁷ relates a case complicated with cancer of the cervix. Schwartz ³⁵⁴ reports a fatal case, in which the cause of the anomaly was found to be a bicornuate uterus. Cases of *placenta prævia* were reported by Couderc, of Paris ¹⁸⁴; Naylor, of Prome, Burmah ²³⁹; Wigmore, of Bath ²²; Stewart, of New York ¹¹⁷; Guthrie, of Auckland, New Zealand ⁵⁵⁷; Lockhart, of Homer, Ga. ²⁷¹; Myers, of Blooming Glen, Pa. ⁷⁷; T. H. Huzza, of Atlanta, Ga., ²⁷¹ in which the foetal head arrested the hæmorrhage spontaneously; Kendall, of Sydney ²⁸⁴; Emile Blanc, of Lyons, ⁴⁸ due to the presence of a large fibroma of the uterus; Vinke, of St. Charles Mo. ¹⁴⁴; Lewis, of Knoxville, Tenn. ¹²⁰; Bolin, of Nolin, Ky. ¹⁸⁶; Gray, of Glasgow ²¹³; Cummings, of Bronson, Kan. ⁴⁹⁰; Hill, of Crickhowell, Eng. ⁶; Newman, of Chicago ²⁷; Purslow, of Birmingham ⁸²; Rhyne, of Chelsea, Ga. ²⁰; Newman, of Detroit ¹⁸⁵; Vondergoltz, of New York ¹⁵⁰; Ahlsfeld ³⁵³; Piggot, of Clare, Eng. ⁶; Allen, of Montreal ²⁸²; Hardon, of Atlanta. ²⁰⁷ Wysham, of Catonsville, Md., ¹² in reporting a case, recommends ergotole, a concentrated extract of ergot, 10 minimis (0.60 gramme), administered hypodermatically, having at once arrested the flooding.

UTERINE INERTIA.

Ipecacuanha.—Drapes ²¹, claims for ipecacuanha the merits of a potent instigator of uterine contraction in simple inertia in either the first or second stage. Where the pains had been feeble and inefficient, or had wholly ceased, two or three 10- or 15-minim (0.66 to 1 gramme) doses of the wine, at intervals of ten minutes, have been followed in a surprisingly short time by energetic uterine action, with rapid termination of the labor. He also claims that it never produces the quasi-tetanic contraction so often met with as the result of ergot, the pains continuing to recur regularly, just as they do in natural labor, but with greater force

and at shorter intervals. H. Stokes, of Grayville, Ill., ¹⁹⁰ _{Aug.} after using this drug twenty-one years, recommends it highly, especially where the os is rigid and unyielding.

Acetanilid.—Acetanilid is recommended by F. E. Verney, of Union, Me. ¹⁸⁶ In twenty or thirty minutes after giving 3 or 4 grains (0.19 to 0.36 grammes) the pains increase in severity and become more regular.

Hydrastis Canadensis.—Bossi, of Genoa, ¹⁶² _{Aug., Nov.,} ² has carefully analyzed 64 cases in which he has administered this drug. The fluid extract, administered at any stage of pregnancy, in doses of 100 to 200 minimis (6.25 to 12.50 grammes) daily for several days, has no evil effect either on the mother or child. It is equally innocuous during delivery. It has a constant, curative, and prophylactic haemostatic action on the uterus during pregnancy, labor, and the puerperium, without any ecbolic effects or modification of the uterine contractions. It is infinitely preferable to ergot, and much less dangerous when distributed to midwives for use in hospitals and in private. Bossi gives from 100 to 150 minimis (6.25 to 9.37 grammes) daily, in three doses, during haemorrhage in pregnancy and labor. He also administers it as an immediately curative agent in flooding during labor, in three or four doses amounting to 200 minimis (12.50 grammes); and in placenta praevia he gives the drug at the beginning of labor and during dilatation of the os. Bossi also uses the liquid extract as a prophylactic agent against post-partum haemorrhage and against flooding in hydramnios, uterine inertia, large foetus, and placenta, anaemia in the patient, and predisposition to flooding from any known or unknown cause, as proved by the experience of previous labors.

PRESENTATIONS.

Nomenclature.—D. Berry Hart, of Edinburgh, ⁸⁸ _{Nov.} states that, although we have at present a nomenclature for the various positions of the child pretty generally agreed upon, it will be found inconsistent if looked into. Hart urges a functional definition, viz.: "Position is the relation to the upper strait of the pelvis of that portion of the presenting part of the foetus which should first rotate to the front in the movement of internal rotation." This is really no new principle, as evidently in face cases the chin has been chosen as the foetal indicator of position, and apparently

because it is of importance that it should rotate to the front in internal rotation. We can now re-arrange the nomenclature as follows:—

Head and face cases retain their nomenclature. In breech we take the hip, and have, therefore:—

Dorso-anterior,	Left coxa-cotyloid.
" " 	Right " "
Dorso-posterior,	Left " "
" " 	Right " "

For transverse cases we have:—

Dorso-anterior,	Left acromio-iliac.
" " 	Right " "
Dorso-posterior,	Left " "
" " 	Right " "

It must be noted that "right" and "left," "anterior and "posterior," refer only to the mother. This nomenclature is accurate, logical, simple, and it tells the student, moreover, a great fact about internal rotation. The old nomenclature was inaccurate, had no logical consistence, and should, in Hart's opinion, be altered.

Face Presentation.—E. P. Bernardy, of Philadelphia,²¹ states that it had been his experience that if the chin presents posteriorly at the commencement of labor, and engages in the superior strait as such, unless changed by manual interferences, there remains posterior position during labor. The treatment of mento-posterior presentations practically resolves itself into two methods,—version and craniotomy. He has failed to obtain any good results from the use of the vectis. The forceps should never be applied when the chin is to the sacrum. This is invariably followed by serious injuries to the mother, without due compensation. Version should only be performed when the presenting face has passed out of the mouth of the uterus. After the face has entered the pelvis all attempts at version are unjustifiable. Should all attempts fail to produce a favorable change in the presenting face, craniotomy should be performed,—not after hours of ineffectual labor, when the mother's tissues are sodden and their vitality destroyed by the continuous pressure of an impacted face, but at once.

Brow Presentation.—Hubert²² records a case in which there was persistent presentation of the brow. The condition is very

rarely met with, and generally in connection with a large, well-formed pelvis and relaxed soft parts. The labor lasted nine hours, and no instrumental interference was necessary. The head rotated round the upper jaw, which became fixed under the pubic arch, the occiput distended, and passed over the perineum without causing any rupture, and the face appeared under the symphysis pubis. The infant lived, and the mother had a normal puerperium. No cause for the frontal presentation was to be found in either the shape of the pelvis or the direction of the uterus. The cord was round the neck, and the author asks whether this might not have been the cause of the presentation?

Occipito-Posterior Presentation.—Zinke, of Cincinnati,²⁷ reported a case of what he believes to have been a primary occipito-sacral, or what the older writers classify as a sixth position. Traction with the forceps completely extended the head, and it became a face presentation by flexion without laceration of the soft parts. A. Worcester, of Waltham, Mass.,⁶¹ July 1, maintains, contrary to generally accepted teaching, that, instead of being less ready, we should be more ready to assist the delivery in cases of occipito-posterior than in cases of occipito-anterior position. After manual rotation of the occiput from posterior to anterior position, the head can be delivered by means of the forceps, or can be drawn down into the pelvis in this acquired favorable position, and left for natural expulsion. The only difficulties attending the employment of this method have been in conforming the traction to the axis of the parturient canal, and in maintaining the anterior position of the occiput while applying the forceps. The first difficulty, common to all high forceps operations, has been practically obviated by the use of axis traction instruments. The second difficulty can be obviated by applying the instruments under the guidance of the operator's hand inside the uterus.

Head Presentation.—Bar,⁴⁸ 2nd exhibited before the Obstetrical Society of Paris a foetus which during labor presented normally; the head was born without difficulty, and the body expelled easily as far as the umbilicus. The remainder of the foetus resisted all natural efforts at delivery. Bar suspected a tumor of some part of the trunk, and confirmed his suspicion by careful palpation. He therefore cut through the body of the foetus and pushed up the breech. The lower extremities were readily brought

down by this manœuvre, and the lower half of the foetus delivered. The malformation which arrested the birth of the foetus was a congenital coccygeal tumor of the usual type, held to represent an amorphous, parasitic foetus,—a teratoma. In the discussion on Bar's paper, Pajot stated that he had observed cases of delayed delivery of the lower part of the trunk; this condition usually signified either ascites or teratoma. Guéniot approved of the obstetric manœuvre adopted by Bar. It was based on the same principle as another operation in midwifery, where, the head having been delivered with the aid of the cephalotribe, decapitation was performed, with the object of allowing room for the obstetrician's hand to draw down the foetal arms, so as to permit the extraction of the body arrested by the breadth of the shoulders.

Loriot¹⁹⁴ alludes to head presentations in general, and especially to cases in which torsion of the neck takes place suddenly just before delivery after a protracted labor; much assistance may be gained by assisting this torsion with the hand when the relative positions of trunk and foetus are such as to permit of it. Pajot, who was present when the paper was read before the Paris Obstetrical and Gynaecological Society, considered this manœuvre only possible when uterine contractions were weak, but impossible of accomplishment when they were strong; he had even tried it with forceps in the latter case, and had failed. He is inclined to consider the manipulation as a dangerous one. Henry,⁴⁸ head mid-wife of the Paris Maternity, after a careful study of the literature of the subject, considers the mortality caused by neck-torsion occurring in the course of labor as 50 per cent. She reports 5 cases of torsion in which this cause could be clearly discerned in the 3 fatal results, and gives a clear outline of the mechanism brought into play.

Shoulder Presentation. — G. Braun²² showed before the Vienna Obstetrical Society a woman aged 26 with a large haemato-ma resulting from a neglected shoulder presentation.

Auvard²³⁶ considers a presentation of both shoulders (following the release of the head), the arms remaining in apposition with the trunk, as the source of greatest danger to the integrity of the perineum. The arms should invariably be delivered first.

Olivier⁶² reports a case of shoulder presentation complicated with hydramnios in which spontaneous cephalic version took place.

He rapidly delivered with forceps. The child was dead. The spontaneous version was doubtless due to the smallness of the child, which weighed only 2800 grammes ($5\frac{1}{2}$ pounds). Another case of spontaneous evolution is reported by J. W. McLane.²⁷ The patient, aged 31, was in her twelfth pregnancy. She had given birth to seven living children, and had miscarried three times in succession. In three of her labors there was a "cross-birth." She was brought into a maternity hospital after having been four hours in labor; a midwife had administered a large dose of ergot, and the ambulance surgeon gave her 10 minims (0.65 gramme) of Magendie's solution hypodermatically. The left arm and funis were found presenting, and the uterus was tetanically contracted around the child. Chloroform was administered, and delivery took place by spontaneous evolution, the head remaining fixed in its original position, whilst the foetus rotated about the point where the neck was jammed against the pubes, the body being doubled up on itself. The labor occupied altogether four hours and fifty minutes. The perineum and cervix were intact. The child weighed 4 pounds 2 ounces (1020 grammes); it was dead, but not macerated, though much ecchymosed. Hot sublimate douche was administered. Convalescence was rapid.

Transverse Presentation.—A series of illustrations from a recent work by Farabeuf and Varnia⁶⁴ presents an interesting study of the method of delivery in transverse presentations. The article illustrates the plan of seizing the foot which corresponds to the antero-superior hip in dorso-anterior positions. The authors assert that continued traction upon the disengaged hip in such a direction as to bring it posterior—traction toward the left, combined with efforts at rotation from left to right when the hook is directed anteriorly and the head to the left—will bring the hip, which originally rested in an antero-superior position, toward the symphysis. The back of the child will then be toward the left ilium, and as the rotary force is further applied the occiput will enter the pelvis in the left occipital position.

Breech Presentation.—R. A. Murray, of New York,¹⁸² gives a general review of the subject of the management of breech presentations, and emphasizes the necessity of careful external examination as to the position of the feet, thorough measurement of the pelvis, watchfulness of the condition of the child's heart, and

appreciation of the resources at our command for quickly affecting delivery, if we would avoid the excessive foetal mortality. He believes that with aseptic hands we can do safely, and without prejudice to the mother, the procedures indicated.

Winter¹⁸¹ concludes an article on the treatment of breech presentations by laying down the following rules: 1. Normal cases to be treated expectantly. 2. Bring down a foot in cases of prolapse of the cord, eclampsia, and contracted pelvis, but not, as a rule, before the os is well dilated. 3. Complete the labor where desirable by bringing down a foot, and proceed at once to extraction of the child. If the breech is too low in the pelvis for this operation, use the finger as a tractor, and, should this prove unsuccessful, employ Bunge's instrument, or a skein of worsted thread.

Staedler¹⁸² notices that manual extraction is the most general practice in Germany in head-last cases. Certain obstetricians, on the other hand, believe that the forceps may prove valuable in many cases, saving a child that otherwise would require perforation. The following statistical table shows that in delivery of the after-coming head the chances of saving the child are high:—

NAME OF OBSTETRICIAN.	No. of Cases.	No. of Children Lost.
Kormann	4	1
Fischer	20	7
Crédé	16	4
Bischoff	10	2
Total	50	14

Thus 72 per cent. of the children were saved, 28 per cent. being lost. So far statistics are favorable to the use of the forceps in after-coming head, at least before the obstetrician resorts to perforation.

Mensinga, of Flensburg,³⁵⁴ reports a case of arrested breech presentation and puerperal convulsions in a robust primipara aged 22. She had been six times attacked with convulsions in two hours. A blue mass projected from the vulva. On close examination, Mensinga found that this mass was a sloughy, greatly swollen scrotum, with the penis. The integument was coming off. On attempting to reach the nearest thigh of the child, the vulva was found so constricted that manipulations were difficult;

so the blunt hook was placed over the thigh. Though but moderate traction was made, the femur broke in the vagina. The rest of the body was gradually delivered; the chin was depressed by means of the introduction of the finger into the mouth. As the forehead swept over the perineum that structure was torn. The child was born asphyxiated and could not be revived.

Edwards Reynolds, of Boston,⁸⁹ discusses the methods of releasing after-coming head and arms, and advocates Deventer's, after reviewing those of Prague and Martin. The method known as Deventer's, in which the after-coming head and arms are extracted together, is one which is little known and practiced, but one which he believes to be well worthy of much greater favor than has hitherto been accorded it. It was introduced and advocated by a French accoucheur of that name early in the eighteenth century, fell into disuse, but has been revived during the past few years by several American obstetricians. When this plan is adopted, the body is extracted in the ordinary way until the points of the shoulders appear; the shoulders and feet are then seized by the hands, and traction is made vertically downward toward the floor, no attention being paid to the arms. The mechanism is as follows: The chin catches upon the coccyx and lower portion of the sacrum, the arms are in apposition with the elastic and yielding sacro-sciatic ligaments, and, by stretching them outward, add so much to the pelvic space that they fail to interfere with the movements of the head; the head extends, the occiput appears at the arch, the perineum is retracted by the neck and chin, the occiput is born by extension, the face follows, and the arms remain in the vagina until after the delivery of the head.

During the last three years he has employed this method a considerable number of times, with the following results: It is totally unsuccessful where the head and arms are arrested at the superior strait; and it is less valuable than other plans when the antero-posterior diameter of the brim is so much contracted as to arrest the head, and the transverse diameter sufficiently large to permit passage of the shoulders; but when version is done in the interests of immediate delivery in normal pelvis, or for arrest due to other causes than extreme disproportion,—that is, when the points of the shoulders appear at the vulva and the head is not firmly arrested by the superior strait,—the manœuvre is superior to

all others in the very important particulars of ease and rapidity. It is so simple that the most inexpert operator can hardly fail in its performance, and occupies but a fraction of a minute after the shoulders are in sight.

TWIN LABOR.

Brém, of Budapest, ⁵⁵⁹ _{Year 1869-1887} has reported some interesting statistics concerning multiple pregnancy and labor, based on 10,000 labors occurring in Kézmarsky's clinic from 1869 to 1887. In the 10,000 cases were 127 cases of twin labor and 3 of triplets, —twins occurring once in 78 cases and triplets once in 3333. Of 252 twins, 133 were boys and 119 girls, the ratio of boys to girls (111.76 to 100) being somewhat higher than in single births. In 37 per cent. of the cases the children were of opposite sex; in 34 per cent. both were boys; and in 28 per cent. both were girls. These relations agree with Lusk's statistics. Of the mothers, 25 per cent. were primiparæ and 75 per cent. multiparæ. In 51 per cent. of the cases there were two separate placentæ, and in 26 per cent. the two originally separate placentæ were united at their proximate borders; in both of these classes there were two chorions and two amnions, which must in each case have developed from two distinct ova. In 23 per cent. there was a single placenta (one chorion and two amnions), which must have developed in each instance from a single ovum with a double germ. In 1 case which, according to present knowledge, must have sprung from a double-yelked single ovum,—a single placenta with freely anastomosing vessels,—there was dropsy of one amnion and scanty fluid in the other, the child in the former sac being normal, while that in the latter was an acardiacus.

Of 248 twins the presentations were: head, in 67.74 per cent.; breech, in 29.43 per cent.; shoulder, in 2.83 per cent. The relative positions are shown in the following table, with a comparison of Spiegelberg's statistics, which latter were based on over 1000 cases:—

	Brém.	Spiegelberg.
Both heads presenting, . . .	47.58 per cent.	49.00 per cent.
Head and breech, . . .	35.47 "	31.70 "
Both pelvic presentations, . . .	11.29 "	8.60 "
Head and transverse, . . .	4.88 "	6.18 "
Breech and transverse, . . .	0.80 "	4.14 "
Both transverse, . . .	0 "	0.85 "

The commonly accepted opinion that the larger twin is usually

born first is not borne out by Brém's statistics, since in 43 per cent. of his cases the smaller child came first. In Spiegelberg's experience the larger twin was usually born last.

In Brém's cases labor was normal in 75 per cent.; in 25 per cent. there was operative interference with one or both children. The length of the labor in primiparæ was, on the average, 21 hours 55 minutes, as against 15 hours 52 minutes in single labors in the same clinic. In multiparous twin labor the average duration was 11 hours 42 minutes, against 11 hours 8 minutes in average single labors.

The interval between the births of twins was less than one hour in 83.04 per cent. of the cases, from one to six hours in 12.50 per cent. of the cases, more than six hours in 4.46 per cent. of the cases.

The practice in this clinic differs from the teaching of Kleinwächter, who taught that the second twin should be delivered, artificially if need be, immediately after the birth of the first.

An interesting study of a case of twin labor, with breech and transverse presentation, and of the placentæ and membranes, is published by Howard A. Kelly. ⁷⁶⁴ Feb. Mar.

UMBILICAL CORD.

Prolapsus.—Z. T. Emery, of Brooklyn,¹⁵⁷ suggests an improved method of managing the cord in prolapsus, which he describes as follows: "The patient is placed in a knee-chest position, somewhat exaggerated by the tilting of the mattress, preparatory to returning the cord by Thomas's method. In attaching the sponge—thoroughly cleansed in boiling water—to the cord, I make use of the following device: A tape, one inch wide and twenty inches long, is bifurcated at each end about eight inches. Three-quarters of an inch from the point of bifurcation of one end a button-hole slit is made in the broad part of the tape, leaving something over two inches of broad tape intact. The sponge is secured by tying the bifurcated ends nearest the button-hole around it, and then drawing one of these through the button-hole and again tying. The bifurcated ends of that part of the tape farthest from the button-hole are then passed around the prolapsed funis, and one end is thrust through the button-hole and the two ends tied securely and further tied around the sponge." It is claimed for this

method that the broad bearing of the tape lessens the danger of destroying the circulation between the mother and child, and that the sponge is held closely adjacent to the cord without constricting the latter nor slipping from either. Passing a loop of the narrow part of the tape into the eye of a gum-elastic catheter and securing by means of the stylet, and pressing forward or upward, with the catheter in his left hand and aiding and guiding the sponge with the right, the cord is passed one side of the sacral prominence, beyond the head of the child and into the uterine cavity.

Knots of the Cord.—Lyucker²¹ has observed 3 cases where a true knot was found in the cord, the child in each case being alive. Fatal cases are reported by Lefour, of Bordeaux¹⁸⁸; Paul Bernard, of Lyons²¹¹; and H. W. Smith, of Elwood, N. J.¹⁸⁶

Etiological factors of importance in these cases are represented by the cord, five feet two inches in length, reported by A. P. Haynes, of Lead City, Dak.¹⁹⁹; another, almost four feet long, by S. W. Lacey, of Toolville, Wis.¹⁸⁶; and a third, five feet in length, by J. I. Blockbank, of Du Bois, Pa.¹⁹⁹. On the other hand, a cord too short may become the origin of marked dystocia, as instanced by the case of twin delivery reported by Thibaudet, of Lille. One cord measured 34 centimetres (about a foot); the other, 36 (about 18 inches).

Rupture.—Loviot, of Paris,¹⁹⁴ reports a case of rupture due to traction on the cord, the retention of the placenta being caused by hour-glass contraction of the uterus. Interesting cases are reported by T. E. Dryer, of Birmingham, Ala.,²⁰² and J. Simpson, of Lindsay, Ont.¹⁸⁶. In the latter case no cause for the rupture could be found. Although the child was only delivered eight hours after the patient noticed the protrusion of the free end of the cord from the vagina it was born alive.

Hæmatoma of the Cord.—A. Bussmann²¹⁷ describes a case of hæmatoma of the cord which he ascribes to torsion. At first the vein gave way; then the blood-tumor formed; and, lastly, the other vessels became plugged. One child was born alive, but its twin was partially macerated when delivered.

DYSTOCIA DUE TO TUMORS.

Westerschulte¹⁶² encountered, as an impediment to the delivery, a large cystic body, which hung down from the child's

breech ; E. Blanc, of Lyons, ⁴⁸ a large fibroma of the uterus, which induced placenta prævia ; Loison and Duchesneau, of Lyons, ²³⁶ _{Sept.} ovarian dermoid cysts ; Conklin, of Elk Rapids, Mich., ¹⁸⁶ _{Nov.} a large cyst of the child's abdomen ; J. T. Hartill, of Willenhall, Eng., ³² _{Aug.} a large vaginal cyst ; G. Braun, of Vienna, ⁵⁷ _{July 12}, a large hæmatoma of the maternal right iliac fossa ; and J. W. Bovee, of Washington, ⁸¹ _{Mar.} general adenomata of the mother, involving the uterine wall.

HÆMORRHAGE DURING AND AFTER LABOR.

H. C. Coe, of New York, ¹ _{Oct. 10} read a paper on "Concealed Accidental Hæmorrhage During the First Stage of Labor," at the meeting of the American Gynæcological Society at Washington, but few cases of which had been carefully recorded. The condition is usually so overwhelming and its results so profound that the accoucheur usually has difficulty in so carefully observing the phenomena as to be able to recall them. The author believes that these cases must often have a traumatic origin, whether from blows or violent coitus, or, what was akin to traumatism, coughing or straining. In the case he had observed, the placenta was fatty and calcareous, and there had been irregular uterine contractions as a possible etiological factor. In some cases it would be possible to diagnose accidental hæmorrhage at its inception, especially if the uterine contractions were irregular and weak, with pain in the lower part of the abdomen, tenderness of the uterus, and weakness of the foetal heart-action. The patient might be restless and yet able to move about. Soon there might be pain of a bursting character in the uterus, with a doughy feel. The hæmorrhage externally might be insignificant, though an enormous quantity of blood might have been poured into the uterus. The pulse and general appearance of the patient would be alarming and the foetal membranes tense. In addition to the serious injury from loss of blood, the condition of shock would be a factor of great importance.

The prognosis is very bad ; his own patient died in a very short time after delivery. Not only are skill and promptness on the part of the accoucheur demanded, but the patient's reparative powers must also be good. The death of the child is usually unavoidable. Rupture of the uterus might occur, especially if pressure upon the fundus, which was advocated by some writers, was

practiced. As to treatment, pressure from without is not indicated, especially if the head has not descended and the os is rigid. Dilatation, turning, and delivery are effective in some cases. Stimulants should be given and ergot subcutaneously. If the head descends, it should be perforated; if it does not, craniotomy and delivery should be practiced. Another useful measure would be to tampon the uterine cavity with iodoform gauze after the placenta and clots had been removed.

Murray advocated plugging the vagina where the os was undilated. Fry thought this useless, and that *accouchement forcé* would increase the shock and the chances of a fatal issue. He referred to Lawson Tait's suggestion of Porro's operation. Coe, in reply, agreed that the treatment consisted in the use of stimulants, and rapid, intelligent, and not too forcible delivery. He considered Porro's operation about as useful as the post-mortem Cæsarian section.

J. W. Ballantyne, of Edinburgh, ²⁶ reports a case of hæmorrhage during labor due to vascular anomaly of the membranes, which teaches that in patients who suffer from hæmorrhage in the last weeks of pregnancy and during labor another possible cause of the bleeding must be kept in mind in addition to those which are so well known. It further emphasizes the necessity of carefully examining the membranes as well as the placenta in all cases of labor. The treatment adopted in this case was expectant; but had the hæmorrhage at any time become excessive, he should have had no hesitation in rupturing the membranes and bringing down a foot so as to control the bleeding.

Velits ⁵⁵⁹ _{Nov. 10 to 12, '90; Sept.} ²⁷ reports 13 cases treated by means of intra-uterine iodoform-gauze tampons, and presents the following conclusions: Iodoform gauze may be considered as thoroughly aseptic for obstetrical work. In atonic hæmorrhages the iodoform-gauze tampons act as irritants and produce permanent contraction of the uterus. To obtain this result, only a small quantity should be introduced into the uterus, so as not to interfere with retraction. In hæmorrhages due to the state of the blood itself the iodoform gauze is worthless, in fact is injurious, for it tends to keep up the hæmorrhage. In these cases we can obtain excellent results by employing weak solutions of chloride of iron. When the hæmorrhage is due to a high cervical tear the only safe treatment

is the suture. Hæmorrhages associated with myomata can only be controlled by packing the uterine cavity firmly and completely with iodoform gauze. Victor Stäheli, of Berne,²¹⁴ also writes an elaborate article on iodoform-gauze tampons, to which he ascribes great value.

Misrachi²⁴ claims that caffeine acts more actively than ergotin. Where the patients have lost much blood hesitation is dangerous, and recourse to caffeine should be had at once. He begins by giving, in rapid succession, three or four Pravaz syringefuls of the following solution:—

R. Benzoate of soda, 3.0 grammes (46 grains).
Caffeine, 2.0-2.5 grammes (31-38 $\frac{1}{4}$ grains).
Distilled water, 6.0 grammes (96 minims).

Inject 6 to 10 syringefuls daily, each of which contains from 0.20 to 0.25 grain (0.013 to 0.016 gramme).

General reviews of the subject, discussing already known methods of treatment, were published by Julius Moses, of Grossbandiss⁶⁹; A. B. Loving, of Pine Bluff, Ark.⁵⁰⁶; Czempin, of Berlin⁸⁴; Jessie G. Forrester, of Chicago¹⁹²; Schauta, of Prague¹⁰⁷; A. P. Clarke, of Cambridge¹⁰⁰³ out.; E. T. Davies, of Liverpool²; and Everke,¹¹⁶ who recommends Duhrssen's uterine tampon. Especially interesting cases are related by Dunagan, of Memphis⁷⁴; H. E. Noble, of Stony Ridge, Ohio²⁸ Mar.; Long⁷⁸⁷; Edis⁴⁹; C. P. King, of Newark, O.¹⁹⁶ May; W. Brinton¹⁰⁴ May; Eugene Anderson²⁸⁵; S. M. Smith, of Geelong, Australia²⁸⁵ July; A. A. Macdonald, of Toronto⁸⁹ July; G. W. Wagoner, of Johnstown, Pa.¹ out.; and C. V. High, of St. Joseph, Mo.¹⁸⁵ out.

RIGIDITY OF CERVIX AND OS.

Under the name of "pseudo-rigidity of the cervix," Auvard, of Paris,²³⁶ describes a condition witnessed in a prolonged labor, which was ascribed to rigidity of the os. The delay was in reality due to a marked deviation of the foetus and the uterus toward the left, with deviation of the cervix in the opposite direction; a bend was thus established which prevented all progress. By merely straightening the uterus and its contents, so as to bring them in their proper axis,—this being easily performed by combined external and internal manipulation,—the delivery was at once accomplished. Guéniot⁴³⁹ discusses two questions raised by

Loriot²⁴: Is the obstetrician justified in making incisions? If he be justified, what is the best method of practice? Guénot answers the first in the affirmative, provided that waiting and gentler measures have failed. In the case of a simple effaced cervix that remains rigid, the edges should be very gently snipped in several places to the right and left, by means of long-handled scissors. When strict antisepsis is enforced this practice is free from danger. The difficulty and danger are great when the cervix retains its normal length down to term, especially when the upper part remains rigid. There is great risk of wounding large vessels. Porak¹⁰⁰ thinks the structure of the cervical tissues as well as the activity of the longitudinal muscular fibres of the uterus should be taken into account in the etiology of rigid cervix. Uterine inertia must be a factor in the non-dilatation of the cervix, even in early rupture of the membranes or in oedema. Articles worth citing were presented by I. I. Van Zandt, of Fort Worth, Texas⁸⁵; A. Zimmermann, of Mannerdorf, Switzerland²¹⁴; Maygrier, of Paris²; Lugeol, of Bordeaux¹⁸⁸; and Ouimet, of Paris.²¹¹

Syphilitic rigidity of the os was the diagnosis formulated by Blanc, of Lyons,²¹¹ in a case of delayed parturition in which the anterior wall of the vagina, extending to and involving the anterior half of the cervix, presented syphilitic sclerosis. He incised the os on each side, and withdrew the child with forceps. The latter lived only a few days, dying in a cachectic state. The diagnosis was clearly verified by the history of both parents. Mesnard, of Bordeaux,²³⁸ also relates a case in the protracted labor, mainly due to the narrowness of the os, which barely admitted the tip of the forefinger, the uterine border feeling like a chaplet of beads, owing to a circle of hard, elliptical, indurated masses. Mesnard made four incisions into the cervix with long scissors; four more were soon found necessary, then forceps was applied. A clear history of syphilis was obtained.

CONGENITAL NARROWING OF THE VAGINA.

Kleinwächter,⁸³ reviewing the literature of this subject, and describing cases observed by him, concludes, regarding the treatment of labor in such condition, that interference should be deferred as long as possible, finding, in 38 cases, that labor proceeded normally in 13; in 10 cases it was necessary to make multiple incisions, when

labor resulted spontaneously; in 4 the forceps was used. In 9 cases multiple incisions did not avail to secure the delivery of the patient, and the forceps was used in addition. In 7 cases dilatation was practiced during pregnancy, labor resulting spontaneously in only 3 of these. The conclusion reached was, that a serious operation is very rarely demanded in these cases.

UNRUPTURED HYMEN.

Ahlfeld ³⁹⁸_{221, p. 100, 244}¹¹² reports 2 cases of labor obstructed by unruptured and thickened hymen, and points out the well-known fact that conception may occur through a minute opening in the hymen. He claims that an unruptured, thick hymen can oppose great resistance to the descent of the head, and will probably, if left to nature, be torn with such violence as to inflict extensive and, perhaps, serious injury upon the structures at the vaginal outlet. Ahlfeld advocates non-interference until the head has descended well in the parturient tract; then, rupture of the membranes, which are usually preserved intact in these cases until they protrude through the hymeneal opening; then, as the head presses upon the hymen, radiating incisions in its structure with scissors. In this way, the writer believes, can extensive tears of the vaginal outlet be avoided.

Hirst ¹¹²₂₄₄ has seen 2 cases of labor complicated by unruptured hymen and small perforation. In neither was labor complicated, nor was interference demanded. The hymen was not, however, very thick in either case.

RUPTURE OF THE UTERUS.

Leopold ⁹⁵_{221, p. 100} reports 4 cases of this complication, and emphasizes the statement that laparotomy should always be performed at once, and under strict antiseptic precautions, in cases where the child has escaped into the abdominal cavity. The danger to the mother increases strictly as to the time since rupture and the force used in attempting delivery, these factors leading to exhaustion and infection. The death of the child follows very soon after rupture. Although the mother may show great shock, if assistance is prompt, and the haemorrhage successfully controlled, the prognosis is good in the worst cases. Uterine rupture at the vesico-uterine fold is more frequent than is generally supposed. The

haemorrhage is not necessarily severe, and may be closed by forced anteflexion of the uterus by pressure and bandage, together with plugging the ruptured uterus and vagina with iodoform gauze.

J. Slechta ³⁵⁴ _{Jan. July, Aug.} describes a series of cases observed in Pawlik's wards at Prague. Of the 8 cases, 3 were complete or perforating. In 2 of these cases the uterus was amputated; in the second the tampon was employed. All died. Five cases were incomplete, and the tampon was introduced in every instance. All recovered. The position of the rupture in the 8 cases was as follows: In the anterior wall of the uterus, 2; both recovered, tampon used. In the anterior wall, extending to the left, 2; tampon in 1 case, amputation of the uterus in the other. In the posterior wall, 1, which died after amputation of the uterus. In the left cornu, 2; both recovered, tampon used. Transverse rupture on the left side, 1; recovered, tampon used. It is remarkable that the last 3—lateral ruptures—recovered, as haemorrhage is severe in such cases and parametritis a very probable complication. On the other hand, the posterior rupture was fatal, but here abdominal section was performed. A laceration through the posterior wall lies in a good position for the escape of discharges, and is the most accessible for therapeutic applications. The borders of the rent and the entire uterine cavity should be disinfected with thymol or boracic solutions, and the edges must be kept in contact by prolonged pressure between one hand in the uterus and the other on the abdomen, pressing the fundus. This proceeding will check the haemorrhage. The point of the finger is next introduced into the rent, and a strip of iodoform gauze is pressed along it and passed around it. Tampons are also passed into the cervix and vagina. Drainage is necessary, but it is only when there has been severe haemorrhage that the fenestrated drainage-tube need be passed into the wound itself. When manual compression of the uterus appears sufficient, the obstetrician must not neglect to place an ice-bag on the hypogastrium. Its action as an antiphlogistic and analgesic is remarkable, and its weight probably insures sufficient compression. The bag may be used for four or five days or longer should there be inflammation. Opium is necessary during the first three days. When the discharge from the drainage-tube becomes fetid irrigation through the tube must be carried out. By the ninth or tenth day the tampons must be cautiously removed one by one.

H. Wardner, of Chicago, ⁶¹ describes a unique case in which a fall caused a loop of small intestine to project into the uterus, possibly ruptured during a labor which had occurred several days before, or on account of the presence of an abscess. The organ contracted so as to expel the foreign mass, producing strangulation and sloughing as a consequence, and causing the faeces to be passed through the vagina. Laparotomy was performed, the necrosed intestine removed, and the free ends stitched together, fifteen inches of small intestine being lost. An abscess was found in the connective tissue between the bladder and the pubis. The patient died soon after the operation. Wardner could not find another such case in literature. A point of importance in differential diagnosis is the fact that traction on the protruding intestinal loop caused severe pain in the stomach and head. All the other symptoms were those of a premature labor or strangulated hernia. Fatal cases of rupture are reported by Colaneri, of Reims ⁵⁷⁷ Dec. 19; Vinay, of Paris ²¹¹ Jan. 11; J. B. Lewis, of St. Paul ¹⁰⁵ Jan. 16; Henry Love ⁶ Jan. 11; and Underhill, of Edinburgh. ⁸⁶ Sept. The last author reported 2 fatal cases. In a third case he performed laparotomy and saved his patient. A brief sketch of the operation might prove useful:—

The patient, aged 28, was admitted into the Maternity for her third confinement. The cord was found to be prolapsed, and a hand was felt lying by the side of the head. Both the cord and hand were pushed up, but the former came down again about an hour later, and was found to be no longer pulsating. Stronger pains came on about six hours later, and during one of these she said she felt something give way inside her. When seen by Underhill no presenting part could be felt. No pain was complained of, and she was not markedly collapsed. On introducing the hand into the vagina, a large tear in the body and cervix of the uterus was made out. The body of the uterus was firmly contracted and lying in the right iliac fossa, and the foetus and placenta were among the intestines. An incision was made in the middle line of the abdomen, reaching from the umbilicus to one inch above the pubes. The placenta was removed first, and then the foetus was seized by the feet and taken out. A quantity of blood was found in the peritoneal cavity. The uterus was drawn out and removed according to the method recommended by Lawson Tait. As the India-rubber tube could not be fixed low enough to include the

whole of the tear, the edges of the lower part were brought together by four catgut sutures. The peritoneal cavity was carefully cleaned by douching with hot water and thorough sponging. The abdominal wound was sewed up with silk sutures, and the stump dressed with sulphate of iron. The patient made a good recovery. The stump came away on the ninth day, leaving a deep hole, which subsequently filled up.

H. C. Coc, of New York, ⁹⁹ presents precisely the same experience,—4 cases, the last of which was saved by laparotomy. He believes that rupture of the parturient uterus is a desperate emergency, in which a fatal termination is the rule, and that it requires prompt and energetic treatment, according to the rule of modern surgery.

Several cases of recovery without operation are reported. ³¹⁷ G. Braun's case had three months before experienced a complete rupture of the uterus during labor. The tear ran transversely above the cervix and longitudinally up to the tube. The child was extracted by craniotomy. The placenta and large masses of clotted blood were then removed. Through the tear a tampon of iodoform gauze was introduced, and the uterus, cervix, and vagina tamponed. Braun referred to other remarkable cures by this treatment, and recommends it in preference to laparotomy in private practice.

Guéniot, of Paris, ³¹⁷ reported a case of rupture with partial extension of the child into the abdominal cavity. The chief midwife of the hospital turned and extracted the infant immediately. Stimulants were administered, ice was applied to the abdomen, and antiseptic vaginal douches were employed. With the exception of a very slight rise of temperature the woman made an uncomplicated recovery.

Carl, of Landeck, ⁹⁹ reports a case in a woman who had borne five children previously without artificial assistance, but who had a contracted pelvis. The child escaped entirely into the abdominal cavity, and was extracted through the rent by version without much difficulty, except when the head was pulled through. A large drainage-tube was placed in the tear, without any attempt at irrigation. Although the woman had high fever for a time and signs of beginning peritonitis, she ultimately made a good recovery.

In a case reported by T. W. Jenkins, of Prague, ²¹⁹ occurring

in connection with a twin pregnancy, after removing the second child, treatment consisted in washing out the cavity between the uterus and peritoneum with a solution of thymol and removal of blood-clots. The uterus was then tamponed with iodoform gauze, the fundus being firmly pressed down by an assistant so as to approximate the margins of the wound. A large drainage-tube was also introduced. The patient exhibited no symptoms of shock; the pulse was good throughout; the tongue, however, very dry; nor were there any traces of haemorrhage, except the few blood-clots found between the uterus and peritoneum.

Another case is reported by T. V. Crandall, of Philadelphia.²³ Cases of partial rupture are reported by Paschen⁸¹⁷ and Lomer⁸¹⁷; and general reviews of the subject were presented by G. Walcher, of Stuttgart¹⁸⁸; Hofheinz, of Königsburg⁶⁹; and Mermann.⁹⁵

INVERSION OF THE UTERUS.

J. M. Baldy, of Philadelphia,¹⁹ in reporting a case of inversion, emphasizes his opinion that none of the forcible methods of replacement which are at present and have in the past been in use, and which are recommended in all the text-books, should be resorted to. If failure to reduce an inverted uterus follow firm and persistent use of the vaginal tampon, the only rational procedure is vaginal hysterectomy. Occasionally, cases are reduced by some of the many methods recommended, but most often they fail. Of these procedures, the one proposed by Aveling is the most scientific and most successful. This consists of continuous elastic pressure in the line of the axis of the pelvis. A special instrument is necessary, and the operation extends at times for days. Following manual attempts at reduction, he has seen a peritonitis set up, as proven subsequently, by a laparotomy, which caused adhesion of everything situated in the pelvis,—tubes, ovaries, intestines, and omentum. Even then the inversion was not reduced. He has seen the abdomen opened, a stout cord passed through the fundus into the vagina, a button attached to the vaginal end, and traction made upon the cord. As an aid to this, the cervix was dilated from above with dilators, and at the same time efforts were made through the vagina, with the hand, to assist in the reduction, all resulting in failure. In fact, he has seen a button tear through the uterus while traction was being made on the cord, and the

patient die, in spite of the fact that the inverted fundus with the hole in it was amputated. The amount of manipulation before the amputation was too much for the woman's already reduced strength. He considers all these methods distinctly illogical and dangerous, and believes they should all be condemned in favor of the quick, safe, and sure method of vaginal hysterectomy, provided that the vaginal tampon has failed, after having been used as before indicated.

Interesting in this connection are the cases reported by S. Rémy, of Paris²²; Carbonell, of Mauresa, Spain²³; and B. B. Levengood, of Bellwood, Pa.²⁴

PERINEUM.

To protect the perineum during the passage of the trunk after delivery of the head, L. Couder, of Paris,²⁵ finds it of advantage to unfold an arm when the shoulders present with folded arms after the expulsion of the head. When a hand presents before the shoulders, it should be drawn down, and the arm entirely delivered. When this is not possible, the hips of the mother should be raised, and when the head has rotated externally the head must be pulled down and the anterior arm freed to the elbow. The elbow is then to be flexed toward the back of the foetus and the anterior arm entirely extracted. The head is then to be raised, and the trunk allowed to emerge slowly. Auvard's remarks to the same effect have already been alluded to.

Holland J. Cotton, of London,²⁶ recommends lateral support of the perineum, which he accomplishes in the following manner: "The hand is partially closed; so that the tip of the thumb presses on the right side and the tips of two or three fingers on the left side of the perineum. The thumb and fingers are separated by a space of three or four inches, and no pressure whatever is exerted on this area, but firm pressure reaches the foetal head through the more fleshy tissues on each side and directs its course forward. More pressure can thus be safely applied than by inserting the finger into the rectum and pushing the head forward,—a somewhat questionable proceeding."

Articles on the prevention of laceration were published by Alexander Duke, of Dublin²⁷; J. Neville, of Omaha²⁸; M. Jackson, of Columbus, Ky.²⁹

An able and careful study of the physiological and pathological aspects of perineal distension is contributed by E. Bonnaire, of Paris. ¹⁰⁰ _{Max. 25} Croft ² _{Max.} and Cheney ¹⁴⁷ _{Ap.} strongly advocate the practice of suturing immediately after delivery, as being simpler and less troublesome to the patient than the remote operation. The danger of sepsis is also greatly reduced.

AFTER-PAINS.

Boardman Reed, of Atlantic City, ⁷⁶⁰ _{Dec. 4, '90} recommends arsenite of copper in after-pains, which he has used in 6 cases. In 4 of these it acted very favorably; in 1 the effect was slight; in 1 it failed entirely. The dose employed is about $\frac{1}{1000}$ grain (0.00150 gramme) administered in a teaspoonful of water. In the cases in which it produced marked relief, opiates had been used with but slight effect.

T. J. Bennett, of Austin, Tex., ²⁰¹² basing his procedure on the fact that after-pains are due to irregular contraction of the uterus, the fundus being contracted while the cervix remains patent, places one hand on the abdomen to steady the uterus and sweeps the fingers of the other hand around the vaginal portion two or three times, at the same time alternately pressing the parts hard enough to touch the portion already contracted; this at once stimulates a further contraction of the organ, and the firmness in the uterine wall will be noticed to take place at, and originate from, the already hardened portion and extend outward toward the rim.

OPERATIVE OBSTETRICS.

Craniotomy.—An able editorial ¹⁰⁵ _{June 1} reviews articles recently published on the advisability of supplanting craniotomy by Cæsarian section. The radical improvements that have been made in the method of performing the latter operation, together with the constant decrease in the mortality of abdominal surgery, have led to the serious consideration of the propriety of extracting the child by abdominal section, in all cases where its life must otherwise be sacrificed in order to reduce its bulk enough to secure its passage through the parturient canal. The suggestion that craniotomy upon the living child should be wholly abandoned, made timidly at first, has now been so often repeated, and its advocates number among them so many men of ability, that the

question makes a strong claim upon the attention of the medical profession.

G. B. Foppiano⁵²⁰ suggests a simple method of perforating the cranium in hydrocephalus in the foetus, and relates a case which he thinks unique in this respect, namely, that the hydrocephalic foetus was accompanied by a healthy and well-developed foetus, and also by an arrested ovum. The healthy foetus had already been expelled when he visited the patient, but the abdomen remained enormously distended. Auscultation revealed no signs of life in the uterus. Extraction by the feet proved impossible, and hydrocephalus was then diagnosed. He decided to perforate the superior wall of the orbit with the finger alone. This was done without much difficulty, and a large quantity of fluid escaped,—about 4 litres (4 quarts),—after which delivery was effected in a few minutes by moderate traction. Moderate haemorrhage came on, and the author proceeded to remove the placenta, but extracted a blighted ovum, weighing about 2 pounds (995 grammes); then followed two large placentæ. The woman made a good recovery.

At the April meeting of the New York Academy of Medicine, a paper by E. H. Grandin,⁵²¹ entitled "Is Embryotomy of the Living Foetus Justifiable?" brought out the opinions of several of the most eminent obstetricians of the metropolis, including Lusk and Garrigues. Grandin, the writer of the paper, expressed the hope that surgeons in hospitals at least would, in the future, cease doing embryotomy and substitute for it some form of the Cæsarian section, thus paving the way for the abandonment in private practice of operations which sacrifice the life of the infant. Grandin takes the position that the Cæsarian section should not be left as a last resort, but should be made an elective operation, just as much as an ovariotomy or hysterectomy. He claims that done in that way the mortality of the section would sink to a comparatively insignificant figure, as low or even lower than that of craniotomy.

Murdoch Cameron, Obstetric Physician to the Glasgow Maternity Hospital,⁵²² takes a ground similar to that of Grandin, and gives a table of 10 Cæsarian sections performed by himself, out of which but one child and one mother was lost, the child evidently being dead before the operation. Cameron says that he thinks the time has come when the lives of both mother and child may be saved, and that the physician has no right to sacrifice the

child. He quotes Barnes as saying recently: "It is no longer permitted to us, without ample proof of clear necessity, to sacrifice the child in order to save the mother. The cases in which the two lives are supposed to stand in antagonism are vanishing before the light of modern science and skill." As an illustration of the horrors of craniotomy, Murdoch Cameron, of Glasgow,² in an admirable paper on the relief of labor with impaction by abdominal section as a substitute for the performance of craniotomy, in which he gives the histories of 10 cases, includes that of a rachitic woman who came under his own care during her last three pregnancies. This woman became pregnant thirteen times between 1862 and 1875, and each time the child's life was sacrificed, either by the induction of labor at half-term or by embryotomy. Finally, Cameron told her that the next time she became pregnant he should insist upon performing the section upon her, with the result that, as he puts it, "she took the hint, and I have had no further trouble on her account."

The opinions and arguments that have been quoted well represent what may be called the radical side of the question,—whether craniotomy is to be entirely supplanted by the Cæsarian section. But the conservative side also has many supporters, among whom may be quoted Lusk, who thinks it a mistake "to allow the idea of an equality in the dangers of the two operations to be promulgated." He holds that craniotomy has a positive place in obstetrics, even when performed on the living child, and however much he abhors the operation he would do it in preference to the Cæsarian section, other things being equal. This conclusion he has arrived at from his own experience with the Cæsarian section,—an experience that is well known to have been by no means entirely discouraging. In the discussion in the New York Academy of Medicine, Garrigues also came out in favor of retaining craniotomy among obstetric operations, even as an operation of choice. He thought the danger to the mother five times as great from Cæsarian section as from craniotomy.

The published results of hospitals furnish reliable statistics of the dangers of Cæsarian section in these hospitals, and make a good showing in favor of the operation; but the same cannot be said of the statistics of the section outside of hospitals, for it is impossible to get at a great many of the unsuccessful operations,

and there are probably a few of the successful ones that never get into print, although it is not the rule for the successful performance of so striking an operation as the Cæsarian section to escape the publicity either of the medical or of the lay press. In St. Paul, for instance, during the last eight years at least 6 Cæsarian sections have been performed, in only 1 of which was the mother's life saved; yet the successful one alone was published, as far as can be learned. The results of these cases certainly bear out Garrigues's statement of the dangers of Cæsarian section, and yet the unsuccessful operations were all performed by surgeons of unquestionable ability,—men accustomed to do abdominal work with good results. In 3 at least of the 5 that resulted fatally for the mother the operation was elective and was performed as soon as labor had begun; that is, with the conditions all as favorable as possible for saving the mother.

Cæsarian Section.—Harris, of Philadelphia,⁵ has published full tables of the Leipzig operations, and of a series of 22 done in America between 1828 and 1880. In the latter series the small number of sutures applied in each case is noted; 12 mothers and 13 children were lost. Harris observes that operators were then apparently more afraid of applying sutures than of leaving a gaping wound as an exit for poisonous fluid to escape into the peritoneal cavity. In the history of the improved or Sänger-Cæsarian operation, Zweifel stands foremost, having lost but 1 woman and 1 child in 18 cases. He has completed an operation in twenty-four minutes. He still uses many sutures, preferring chromic-acid catgut. The total number of operations at Leipzig is 35, with 2 maternal deaths (including Zweifel's case) and 2 children lost, though, of the 2, 1 lived a month. The children were saved in the 2 cases where the mothers died. Dresden, with six operators, furnishes a longer list of cases than Leipzig. The mortality is somewhat greater, as a larger proportion of the women were operated upon under desperate circumstances. Leopold has had more Cæsarian deliveries than any man living; he had lost 3 women when he reached the present number of Zweifel. Harris cannot give the full record, but the percentage of loss has been smaller than the best Porro-Cæsarian work in Europe. The Porro record of all countries for 1885-89 amounts to 157 cases, with 48 deaths and 25 children lost. In the year of the lowest mortality (1888) there was a loss

of 15½ per cent., or 5 out of 37; but in 1889 it rose to 32½ per cent., or 10 in 31. Milan gives the best Porro record in Europe. The mortality in 31 cases was 9, with 2 children lost. This is a percentage of 29, against 5½ per cent. in Leipzig under Sänger-Cæsarian section. Vienna has had many more Porro operations than Milan, but 15 women out of the first 31 were lost. For the past four years the as yet unpublished record will show a much diminished death-rate; that of Milan during the same period being far higher. This operation appears to have a general average mortality of 28 per cent. In 1887 there were 53 "new Cæsarian" operations, with 11 women and 4 children lost,—a mortality of 20½ per cent.; and in 1888, 79 operations, the loss being 18 women and 3 children, or 24 per cent. The cutting away of the uterus must always add to the gravity of a Cæsarian delivery in cases where this organ is sound and the child living. When the child is dead and putrid, where the body of the uterus is the seat of fibroids, or where there are septic symptoms, the Porro-Cæsarian method is to be preferred. Sänger and many Continental operators are opposed to removing the ovaries or tying the Fallopian tubes, especially in a married woman. If the danger of Cæsarian delivery can be reduced to 6 per cent. (and this ought to be reached in women previously operated upon), then the question of sexual mutilation must be very seriously weighed, for Harris scouts the doctrine that rachitic women, of necessity, bear puny children. Lastly, he observes that the woman must be in the best possible condition and the child vigorously alive, or the technique will be a weak dependence for success.

Crimail, of Pontoise,³ performed Cæsarian twice on the same woman,—the first in October, 1888, and the second in February, 1891. The patient was not rachitic, but had a uniformly contracted pelvis. In order to provide against the possibility of another pregnancy, Crimail placed a double ligature around each Fallopian tube near the uterus, then divided the tubes between the ligatures. C. P. Noble, of Philadelphia,^{19, 20} reported another instance. In his case the first operation was performed by Howard A. Kelly, in April, 1888. Although the uterine section did not heal completely, leaving a fistula from the cavity of the uterus to and through the abdominal wall, and partial destruction of the uterus by sloughing had occurred, conception

again took place. In performing the second operation the fistula was enlarged to incision from below upward; the peritoneal cavity was opened, in order to obtain the necessary amount of room. A living foetus was extracted. The patient passed through this unique experience with satisfactory results as to the healing of the wounds; she is now in good health. Noble does not approve of the performance of any subsidiary operations for the purpose of preventing future pregnancies, as was done in Crimail's case; he would do nothing to prolong the section.

Korn, of Dresden,⁸ said, at the Fourth Congress of the German Gynaecological Society, that he had performed Cæsarian section three times on the same woman. He had never observed adhesions. The cicatrix was found to be quite superficial at the third operation, with normal muscular tissue beneath. He was struck by the intensity of the suffering during contractions at the third labor, morphia being practically useless. The subject was also discussed before the Michigan State Medical Society,¹⁰⁰² having been introduced by Hugh McColl, of Lapeer, who considers craniotomy as unjustifiable, unless the patient positively refuses Cæsarian section. Manton, Carsten, Longyear, Martin, and Cogshall, took part in the discussion.

Howard A. Kelly²⁷ lays down the following rules, based on the collected experience of many authorities: 1. Do not use antiseptic solutions for instruments or hands after the operation has begun. Above all, do not use them in the abdominal cavity. Use pure water throughout, preferably distilled, which has been boiled half an hour. 2. Do not turn the uterus out of the abdomen before delivering the child, unless its contents are doubtfully septic. It does no good, adding an unnecessary step, and calling for a larger abdominal incision. 3. Do not cut the placental tissue, thus bleeding the child, in *placenta prævia Cæsariana*. 4. Do not waste time picking off small shreds of decidua from the inner surface of the uterus. 5. Do not do a conservative Cæsarian operation when the uterus is already septic. If the uterus be infected, do a supra-vaginal operation after Porro's method. 6. Do not use catgut of any kind as a uterine suture. It has proved dangerous and uncertain. 7. Never use a continuous suture in the uterus. 8. Do not attempt to drain the abdominal cavity; it cannot be done effectually. 9. Do not douche out the vagina as

a matter of routine after the operation. It must be carefully disinfected beforehand; afterward an aseptic genital tract will need no active antiseptic *régime*. 10. Let all preparations be so full and carefully made beforehand that no time shall be lost, and each successive step shall follow its predecessor with the utmost rapidity consistent with accuracy, and the whole be completed with dispatch.

Münchmeyer⁹⁵ reports 3 cases of Cæsarian section performed according to Sänger's method, making the record of the Dresden clinic 28 Cæsarian sections, with 3 maternal deaths and 1 foetal death. Münchmeyer has had the opportunity of examining, post-mortem, two uteri on which the Cæsarian section had been performed. The patients had survived several months, and died by some intercurrent disease. Microscopical examination of the chromic-acid catgut sutures employed found them holding the parts firmly in good apposition, and the suture material itself undissolved and resembling in firmness silver wire. The silk suture, however, which had been used to close the abdominal wall, had been partly absorbed. In his opinion, chromic-acid catgut is the best suture for the uterus, and silk the best for the abdominal wall.

Cases are reported as follows: 1 by Queirel, of Marseilles²³⁶ _{Dec. 19} (successful); 1 by G. Galaud, of Ixelles, Belgium²³⁸ _{Dec. 22, '90} (successful); 1 by R. F. Granger, of London² _{Mar. 1} (successful); 10 by Murdoch Cameron, Glasgow² _{Mar. 1} (9 successful; 1 death, the result of an accident immediately before the labor); 1 by J. N. Bartholomew, of Trenton, Ohio¹ _{Mar. 14} (successful); 1 by M. Bar, of Paris²⁴ _{Apr. 1} (successful); 1 by M. Guéniot, of Paris²⁴ _{Apr. 15} (successful); 1 by Seth Hill, of Stepney, Conn.²⁰⁰² _{May 27, '90} (successful); 1 Sänger-Cæsarian by P. Meiowitz, of New York¹⁰¹ _{May} (successful); 1 by Herman, of London⁶ _{May 1} (made necessary by an osteosarcoma of the pelvis nearly filling the pelvic cavity; death; child saved); 4 by Howard A. Kelly, of Baltimore¹ _{May 1, '91} (all successful); 1 by H. P. Wenzel, of Milwaukee²⁸ _{July} (successful); 1 by Henry Gibbons, Jr., of San Francisco, Cal.¹⁴⁷ _{July} (successful); 2 Sänger-Cæsarian by E. Fraenkel, of Breslau⁶⁹ _{Aug. 16} (successful); 1 by J. Praeger⁸¹⁷ _{Nov. 10} (successful); 2 by Staude, of Hamburg⁶⁹ _{Dec. 1} (successful).

Porro's Operation.—Clement Godson,² _{Oct. 10} in reporting 2 cases, makes an earnest plea in favor of Porro's operation, and emphasizes his opinion that every accoucheur should be prepared to perform Porro's operation, and not resort to craniotomy as a matter

of course, in a case of pelvic obstruction in which delivery cannot be effected by the forceps, and especially when the foetus is living. He believes that Porro's operation is less dangerous to the mother than difficult craniotomy. He cites an instance in which he was called to a primipara to assist two excellent practitioners who had used one forceps after another, and pulled, first one and then the other; the cervix uteri had been extensively lacerated, but the head had never moved. The foetus was dead. He managed to deliver the woman by craniotomy, but the extraction was very difficult; after he got the head out he thought he should never have extracted the shoulders. It was a large foetus. He made out the conjugate to be about three inches. This woman would probably have recovered had abdominal section been performed early; as it was, she died on the fourth day. It is very sad to think that here a woman and a fine child were sacrificed, both of whom might have been saved. He does not mean, however, that Porro's operation or Cæsarian section should be undertaken impetuously or without proper consideration and preparation, but is convinced that it should often be undertaken by the general practitioner in place of craniotomy. Piskaček,¹⁰⁰⁴ in absolute contraction of the pelvis, pronounces himself in favor of the Porro operation. His reason is the danger of a second Cæsarian section in the event of a new pregnancy, and the risk of uterine rupture, should the operation not be done immediately at the onset of labor.

Cases are reported as follows: 1 by Ginsani ²_{ms.} (successful); 1 by Joseph Price, of Philadelphia ²³_{ms.} (successful); 1 by G. G. McLaren, of Dehra Dun, India ²_{ms.} (successful); 1 Porro-Müller by Wm. E. Ashton, of Philadelphia ⁹_{ms.} (successful); 3 by Frank, of Cologne ⁸_{ms.} (successful); 1 by G. Helbing, of Bonham, Texas ¹⁹²_{ms.} (successful); 1 by J. F. Baldwin, of Columbus, Ohio ⁸⁴⁹_{ms.} (successful); 1 case of Tait-Porro, by Colin G. Campbell, of Saddleworth, York, England ⁶_{ms.} (successful); 1 by Bagot, of Dublin ¹⁶_{Sept.} (successful); 1 by N. T. Brewis, of Edinburgh ³⁶_{ms.} (successful); 2 by James Murphy, of Sunderland, England, ²_{ms.} (successful); 1 by Carmichael, of Barrow-in-Furness, England ⁶_{ms.} (successful).

INSTRUMENTS.

Duke, of Dublin,²¹³ suggests additional traction in forceps cases as an alternative of craniotomy. He stated that the idea of at-

taching the forceps in some way to the body of the operator struck him several years ago, while assisting at a delivery, when he grasped the practitioner around the wrist to get additional power, and a living child was delivered. Without this additional power they would have been forced to do craniotomy. He uses tractors which can be buttoned into the fenestra of any long forceps before application. The power is got by means of a belt from the tractors around the body. By throwing his weight alone on the belt he could get a power of 140 pounds (56 kilogrammes), measuring with a manometer; while by using his arms also he could put a further strain of 28 pounds (11.2 kilogrammes) on. He gave several difficult cases in which he had found it of great use.

An elaborate and excellent article on the axis-traction forceps, their mechanical principles, construction, and scope, was presented by R. Milne Murray, of Edinburgh.²⁸ He justly gives to Tarnier, of Paris, the credit of discovery, notwithstanding the fact that others had recognized the *desideratum*, and in their efforts to comply with the latter had either partially or completely failed. Tarnier applied to the solution of the problem an entirely novel principle, solving the difficulty. Murray's article, which covers almost 100 pages, is entitled to careful study by all those who devote their ingenuity to the perfection of forceps.

Modifications have been suggested by J. E. Elston, Ohio,⁸² —an upright lever fastened to the lock; A. B. Lyman, of Baltimore,¹ —a movable attachment for any kind of forceps, so shaped as to obtain direct axis traction; T. J. McGillicuddy, of New York,⁶¹ —a hinged flange to the handle, which serves as grasp when turned downward, and enables the operator to produce axis traction; W. O. Lambert, of London,² —a screw and slot to the extremity of the handles, to do away with the necessity of tying them. C. R. Hoffmann, of New York,¹ contributed a modified (in size and thickness of blades) short perineal forceps. Peter McCahey¹ demonstrated on the manikin his atmospheric tractor, described in last year's ANNUAL, before the New York Academy of Medicine; an interesting discussion took place between the inventor¹ and A. W. Herzog, of Hoboken.¹

As a sling to support the limbs in forceps deliveries, R. L. Dickinson, of Brooklyn,²²⁷ passes a rolled sheet behind the neck and under the bent knees, the thighs being flexed as high as

possible. Dargatz, of Kansas City, Mo.,⁷² describes a portable, light, and strong obstetrical chair. An obstetric slipper, to dispense with the traction towel or sheet, was described by D. L. Hubbard, of New York.¹ Henry Leaman of Philadelphia,²³ described what he calls a "parturometer,"—an instrument devised to measure the force with which the foetal mass is advancing along the parturient canal.

A new craniotome, including the saw and forceps features, was introduced by Poirier, of Paris.⁷³

STATISTICS OF LABOR CASES.

A series of statistical reports have been published during the year. The papers are enumerated for the benefit of those who might wish to use the information contained in the journals mentioned for the preparation of general reports: Pozzi, of Paris, ⁵⁵ 625 labors; Tournay, of Brussels, ²⁵⁶ 380; E. R. B. Elderdice, of McKnightstown, Pa., ¹⁸⁶ 500; N. Charles, of Liége, Belgium, ²⁵⁶ 456; W. H. Taylor, of Cincinnati, ⁵³ 300; W. A. Dunn, of Boston, ⁹⁹, 1168; G. S. Stein, of Columbus, Ohio, ²³³ 822; G. H. Rohé, of Baltimore, ¹⁰⁴ 100; W. Sealy, of New Zealand, ⁵⁵⁷ 2589; A. Worcester, of Waltham, Mass., ⁹⁹, 200; W. J. Cree, of Detroit, ¹⁸⁶ 200; J. L. Beeston, of Newcastle, New South Wales, ²⁶⁷ 800 cases.

HISTORICAL DATA.

Our corresponding editor, J. K. Kimura, of Tokio, Japan,⁷⁴

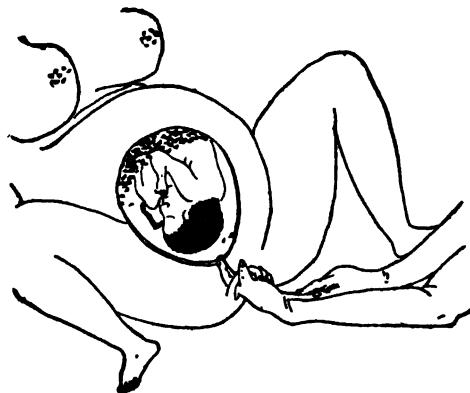


FIG. 1.—METHOD OF PUNCTURING THE MEMBRANE.

sends us an illustrated report on midwifery in the sixteenth century, taken from old works, which are, of course, difficult to



FIG. 2.—FIRST MOVEMENT IN THE APPLICATION OF THE "ÉCRASEUR FORCEPS."



FIG. 3.—SECOND MOVEMENT IN THE APPLICATION OF THE "ÉCRASEUR FORCEPS."

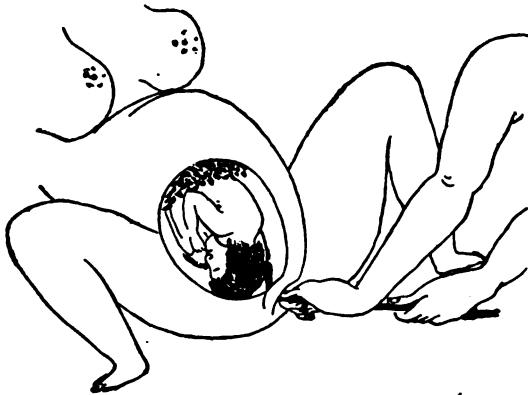


FIG. 4.—THIRD MOVEMENT IN THE APPLICATION OF THE "ÉCRASEUR FORCEPS."

reach, their scarcity being explained by the fact that they were written by hand. Kimura states that there are some points in them which might be considered as additions to the literature of European medicine.



FIG. 5.—LINE OF TRACTION WITH LOOP TO FACILITATE FIRST STAGE OF LABOR.



FIG. 6.—LINE OF TRACTION WITH LOOP IN THE SECOND STAGE OF LABOR.



FIG. 7.—PULLING DOWN A LEG BY MEANS OF A HOOK.

It is rather surprising to find a full description of and the rules for using the obstetric forceps, with the illustrations, in books written about two hundred years ago (*vide* the accompanying drawings, which are reduced, but exact, copies of those appearing



FIG. 8.—BRINGING DOWN SECOND LEG BY MEANS OF "ÉCRASEUR FORCEPS."

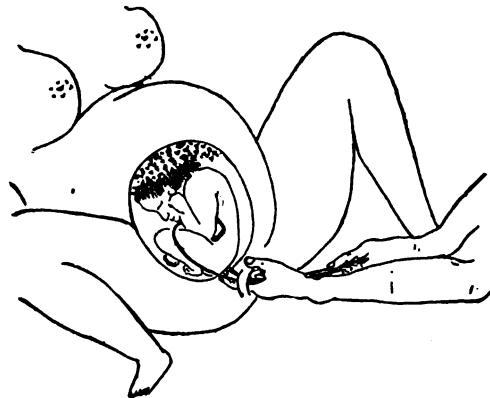


FIG. 9.—BREECH PRESENTATION. FACILITATING LABOR BY THE USE OF A WIRE LOOP.

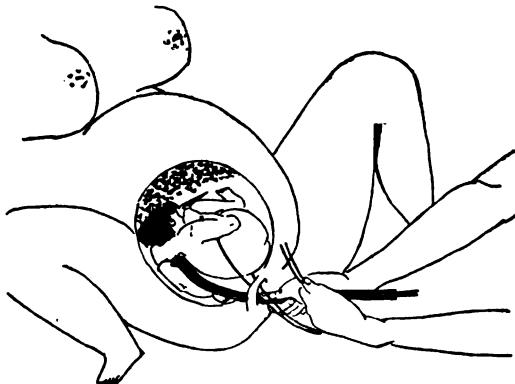


FIG. 10.—CHANGING POSITION OF FETUS BY COMBINATION OF "ÉCRASEUR FORCEPS" AND LOOP.

in the book). It is said that the forceps was introduced by a Dutch physician, who claimed it as his own invention. He came to Japan about three hundred years ago, during the reign of Tokugawa. From that time the instrument was used among a



FIG. 11.—REPLACING UPPER LIMB AND THE PROLAPSED CORD BY MEANS OF THE
"ÉCRASEUR FORCEPS."



FIG. 12.—BRINGING THE HEAD IN POSITION BY MEANS OF AN "ÉCRASEUR FORCEPS."



FIG. 13.—FACILITATING BREECH PRESENTATION WITH WIRE LOOP.

few physicians as a "secret method." Hanaoka, of Osaka, is very famous, even now, as an obstetrician, being one of those who received the knowledge of this "secret method" by inheritance.

It is a well-known fact that children thrive well in Japan;

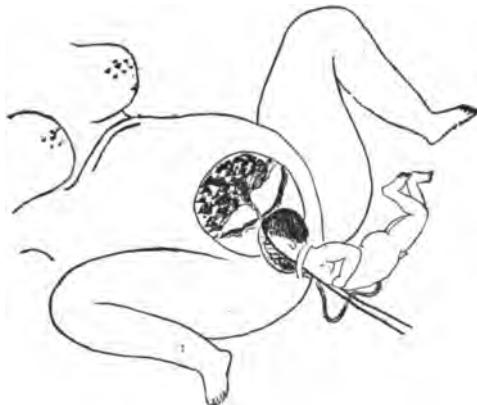


FIG. 14.—NET TO FACILITATE DESCENT OF HEAD.

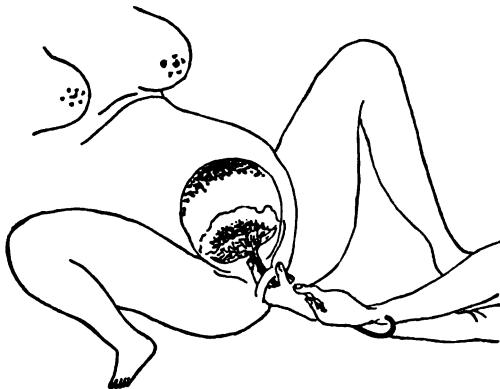


FIG. 15.—WITHDRAWAL OF THE PLACENTA.

that is, the mortality of children in that country is very low compared with that of other countries. This has been accredited to the climate, but the peculiar customs of the empire have, to a certain extent, some influence upon it.

Even nowadays it is the universal idea among the laity that the cause of disease or poisonous matter should be discharged entirely from the body of a newborn infant before commencing to nurse. For this purpose an infusion of the following compound, known as "Makuri," is always given internally to the infant to produce a cathartic effect:—

R. *Corallinae Corsicanæ*, . . . gr. xl $\frac{1}{2}$ spoonful (2.67 grammes).
Carthami tinctorii, . . . gr. xl $\frac{1}{2}$ spoonful (2.67 grammes).
Coptidis anemonæfoliæ, . . gr. xx $\frac{1}{2}$ spoonful (1.82 grammes).
Rhei, gr. xx $\frac{1}{2}$ spoonful (1.82 grammes).
Glycyrrhizæ, 3j 1 spoonful (4.00 grammes).

M. Sig. : Make an infusion by adding 6 or 7 ounces (175 to 200 grammes) of hot water.

The old method is to measure these crude drugs with a spoon about the size of an ordinary teaspoon.

The administration of this infusion is continued for at least twenty-four hours, commencing immediately after birth. If the babe be strong, the medicine should be continued for two or three days,



FIG. 16.—POST-PARTUM BANDAGE; FRONT VIEW.

and during this time nothing else should be given. Kimura states that he has been compelled to follow this method in 3 cases, as the old grandmother refused to apply the babe to the mother's breast without giving "Makuri." He has not seen, in his own cases or



FIG. 17.—POST-PARTUM BANDAGE; REAR VIEW.

in others, any bad results from it. Nursing is generally continued from three to four, even five years, notwithstanding the child may take other food after one or two years of age. Wet-nurses are very common among the well-to-do people, as cows' milk was unknown until quite recently.

PUERPERAL DISEASES.

BY WALTER P. MANTON, M.D.,
DETROIT.

Silver ⁵⁸ in pleads for reform in the practice of obstetrics. He would have the physician's duties begin with pregnancy and end only when every organ concerned in the reproductive act has returned to its normal condition following puerperal. He thinks that the practitioner should assume greater responsibilities, not only in regard to the immediate management of a case, but also with reference to the most remote effects.

In a paper on the diagnosis of the parous state, Dittrich ⁸⁸ _{No. 20, 190} points out that, in order to determine whether a person (dead) has borne children or not, it is important to remember that the non-puerperal uterus withstands decay longer than any other soft part of the human body. Macroscopically, the uterus of a woman who has borne repeatedly is easily recognized by the changes in the form of the os and by the cicatrices resulting from former tears. In other cases—those in which but one labor has taken place, especially a premature birth or abortion—the os appears transverse, and after some time has elapsed post-partum may be indistinguishable from the virgin uterus. Microscopically, the changes in the arteries, pointed out by Balin, are always found in persons who have borne children at term. In parous women Dittrich found a necrosis of the uterine musculature, and this he considers an indisputable sign of a previous pregnancy.

Duke ²⁸ urges the necessity of careful examination of the genital tract after labor, as lacerations are often present, which may require suturing or the application of strong carbolic acid, the absorption of septic matter being thereby prevented. He also advocates the flushing of the uterus with hot water directly after labor, claiming that the heat acts as a stimulant to the patient,—washes out shreds, etc., produces contraction of the uterus, prevents after-pains, and assures a clean and untainted uterine cavity.

Puerperal Infection.—An interesting case of puerperal infection developing in the wife of a rag-picker is described by Markus.⁸³ The woman, aged 38, and the mother of two children, was delivered of twins in the same room in which her husband stored his wares. On the ninth day post-partum she became ill, and was carried to the hospital. At that time there was a fetid uterine discharge, associated with imperfect involution of that organ; trismus, salivation, and dysphagia. The parametrium was free from exudate, the temperature low, the pupils reacted well to light, and the sensorium was unaffected. The urine contained a trace of albumen. Fever, dyspnoea, and tetanic contractions of the muscles at the back of the neck set in, and the patient died two days later. At the autopsy, performed by Chiari, the following conditions were found to be present: icterus, necrotic endometritis, septicæmia, a recent thrombosis of the right ovarian plexus, and enlargement of the spleen. An emulsion made from the patient's medulla and injected into a guinea-pig gave negative results. Markus is of the opinion that the origin of the infection was in the endometritis; the ptomaines which were formed at this point being absorbed into the circulation, gave rise to the various phenomena presented.

A curious source of infection, from which 3 patients were contaminated—1 dying—is recorded by Döderlein.⁸⁵ The patient first attacked wore a glass eye, the roughened upper margin of which had caused ulceration of the conjunctiva and palpebrarum, and led to a suppurative conjunctivitis. It is thought that a midwife must have transmitted septic matter from this eye to the three parturient women. The midwife, however, is said to have employed the prescribed antiseptics before touching the patients. Gendron¹⁹¹ reports 2 cases of infection caused by the presence of a putrid foetus *in utero*. After delivery and irrigation of the uterus with antiseptics, the temperature gradually fell to normal. Paramuchi,⁶ records a case of puerperal pyrexia (infection?) caused by a putrid tape-worm in the uterus. The parasite is supposed to have migrated from the rectum into the vagina and there have died. Ground² saw a case of infection due to a defective drain in the basement of the house. Salter⁶ reports a fatal case, developing on the ninth day post-partum, in a previously healthy woman. A case of suppuration of the thyroid

gland secondary to infection is reported by Kirmisson.³³ Chazan⁴⁰⁴ states that self-infection, as a special variety by which the body of a lying-in woman becomes affected, is an impossibility.

From a study of puerperal endocarditis, Luzet and Ettlinger³⁶⁰ find that infection plays a prominent causal rôle, and that the seat of the affection is frequently the right heart. The infection travels slowly through the venous system to the heart and lungs, perhaps occupying many months in its course. Pulmonary complications are usually present, and are due to septic emboli; the course, however, being so slow as to simulate tuberculosis. It is stated that mild cases may recover.

Puerperal endometritis is placed by Bumm³⁴ under two forms, —the putrid and the septic. In the first only putrid germs are found; a relatively infrequent occurrence, the condition usually being a mixed form. In putrid endometritis the inner layer of the uterine mucosa is in a necrosed state, and is filled with the germs of putrefaction, which in places form colonies. Below the necrosed layer a reaction zone is found, formed by a compact round-cell infiltration of the tissues. This causes a casting off of the dead portions. The putrefaction germs do not penetrate into the reaction zone. Septic endometritis develops when the germs of septicaemia—pyogenic streptococci and staphylococci—develop in the puerperal deciduæ. Saprophytes are also frequently found along with these pathological organisms in the innermost layers of the mucosa. Those conditions formerly known as purulent, putrescent, diphtheritic, croupous endometritis, etc., are only sub-varieties of septic endometritis. In localized septic endometritis a condition similar to that of the putrid form is found; where this spreads, the reaction zone is more or less defective, and in acute cases fails altogether. Dissemination of the pathological germs takes place through the blood-vessels and lymph-canals; in markedly virulent cases the germs reach the parametrium and peritoneum through the lymphatics.

Swiecicki⁷⁸³ argues that, as puerperal infection arises from intoxication of the system by bacteria and their products, treatment should aim at the elimination of these morbid elements. He therefore recommends the administration of considerable quantities of a solution of sodium chloride to induce free diuresis; sponging the body with ether, to remove the fatty material which may clog

the pores; and subcutaneous injections of pilocarpine, 0.01 grammie ($\frac{1}{16}$ grain), twice daily for three days, to stimulate the action of the sudorific and mucous glands.

McMurtry¹⁰³ insists that the time for resorting to intra-uterine irrigation after labor is in the earliest stages of sepsis, and that this should be performed in a surgical manner. The principle of this treatment is that of flushing and drainage, the efficacy of which has been demonstrated so notably in similar conditions known to pelvic surgery. Dorr¹³² believes that iodine is the best drug for use in irrigations, for, although it is not the most powerful germicide, its wide range of curative powers in removing the products of inflammation, etc., makes it a most desirable remedy in these cases. One drachm (3.89 grammes) of the tincture iodini comp. is used to the pint ($\frac{1}{2}$ litre) of water, and the douches are repeated every six to eight hours. Two cases were treated successfully by J. B. Johnson¹³⁶ with minute doses of arsenite of copper. The bowels were kept open with calomel, turpentine applied to the abdomen, and an antiseptic douche given three times daily. Charrier³⁶⁰ recommends the early curetting of the uterus in cases of infection, with subsequent washing out and tamponing the cavity with iodoform gauze. He believes that this method will diminish the tendency to these maladies, which so often develop later in the uterus and appendages. Fritsch,¹³⁹ on the other hand, advises against the use of the curette, inasmuch as infection starts chiefly from the cervix; so that the curette cannot reach the true seat of the affection. Dorr¹³² favors cæliotomy and irrigation of the abdominal cavity in those cases which do not yield to anti-pyretics and intra-uterine douching. Montgomery²¹² believes that under these conditions an exploratory incision is justifiable, to determine whether or not pockets of pus exist. Where the presence of fluctuating masses in the abdominal cavity is evident, recourse to surgery should be had.

Puerperal Peritonitis.—Rubeska⁸⁴⁴ has investigated the purulent puerperal affections, and concludes: The lochia of healthy puerperæ contains no microbes, but where there is even the slightest degree of fever they are present. In severe cases, as a rule, the streptococcus is present; in purulent parametritic exudates pyogenic bacteria, most frequently streptococci, more rarely staphylococci. Even in those cases which go on to absorption streptococci are

found. All parametritic inflammations are the result of infection. In the purulent forms pyogenic micro-organisms, especially streptococci, occur. Peritoneal exudates contain, as a rule, streptococci, often staphylococci, or various other kinds of bacilli. In the most acute cases, where the exudate is not purulent, pure cultures show the streptococci in great numbers. In a few instances, especially *sub finem vita*, the streptococci appear in the blood. McPheeters⁶⁵ states that he has come to consider the gulping vomiting, without effort or nausea, a fatal symptom in puerperal peritonitis; he has seen but 1 case recover after its onset. In fresh parametritic exudations Fritsch²² recommends operation *per vaginam* in the second or third week after labor. He begins by dividing the vaginal wall over the lowest part of the exudation, and through this opening works a passage into the abscess with the fingers, finally cautiously enlarging the opening with the knife. As soon as pus is seen, a stream of sterilized water is directed into the abscess-cavity, and allowed to run until it returns clear. The edges of the abscess-cavity are then stitched to the vaginal opening, the ends of the sutures being left long. Further treatment consists in washing out the abscess with a double catheter.

Oliver⁴⁹ believes that the time has come for treating some of these cases by abdominal section. Ricketts⁵³ says that opium should be given sparingly in these cases, and after free purgation. When a tumor is found, or delirium comes on, prompt opening of the abdomen, with irrigation and drainage, is indicated. In a case operated on by Murphy, at the Sunderland Infirmary,² three weeks after delivery, fully a gallon (4 litres) of stinking pus was evacuated. The patient made a slow convalescence, but eventually returned to robust health. In a patient from whom Moore²⁸⁵ removed 6 pints (3 litres) of pus, a counter-opening for drainage was made through the back. Evans also reports a successful case of this nature.²³

Puerperal Exanthemata.—Wilson²³ reports 2 cases of symptomatic dermatitis occurring in puerperal women. In the first case the eruption appeared as a papular erythema on the fifth day post-partum, while in the second it was a bright-red flush on the eighth day after labor. Charles²⁵⁶ records an outbreak of scarlet fever in the maternity at Liége. The midwife, several pupils, and one puerpera had shown symptoms of a mild grade of the disease,

when a puerpera and a pupil-midwife were attacked. To prevent an epidemic the hospital was closed, the pupils sent home, and the wards thoroughly disinfected.

Malaria.—From a study of 46 cases, Abelin,²²⁶ arrives at similar conclusions to those of KruseNSTERN (ANNUAL, 1891, vol. ii, K-8) in regard to the effect of malaria on the puerperal state. The cachexia induced by chronic malarial poisoning appears to give rise to a tendency to post-partum haemorrhage. Acute intermittent fever, however, does not predispose to haemorrhage, but prolongs and increases the amount of the lochial discharge. In order to be certain that febrile attacks in the puerperium are due to malaria, it is necessary to exclude all causes of high temperature due to local disturbances of the genitals and the breasts. Malaria is not more severe during the puerperium than at any other time, and, if treated from the start, is not a serious puerperal complication. Sewell,²³ relates a case of intermittent malarial fever which developed twenty-four hours post-partum. The child appeared fretful from the first, and subsequently developed the fever, dying, on the twenty-eighth day of life, from peritonitis. Miller²² reports a case of chronic malarial poisoning in which tetanus developed. During the attack opisthotonus was marked, the patient resting on the head and feet, so that the lumbar region was raised about eighteen inches from the level. The autopsy revealed no abnormal condition.

Puerperal Psychoses.—Adam Wright,²¹² after careful observation, during a period of ten years, finds that very serious results may follow causes which are purely nervous in their origin, and agrees with Barker that mental emotions have much to do as an exciting cause of puerperal mania and other conditions. Madame Gorsky²¹³ finds that puerperal insanity is not a true etiological species, but only an active, delirious phase of mental degeneracy and a neuropathic tendency. The hereditary taint and morbid predisposition are the true cause of the disease, the puerperal condition only its immediate and exciting cause. Out of 133 cases cited by the author, 21 began during pregnancy, 55 followed parturition, and 57 occurred during lactation, thus showing that it is at this period that the disease appears by preference, as has been pointed out by Marie, MacDonald, and Krafft-Ebing.

Olshausen²³³ places puerperal psychoses under three heads:

1. Those dependent upon febrile conditions,—infection psychoses. These cases are usually found associated with puerperal pyæmia and ulcerative endocarditis, more rarely in so-called septicæmia (lymphangitis with peritonitis). In these cases, when psychoses develop, the direct cause is usually meningitis, or encephalic processes, especially capillary embolisms. 2. Idiopathic psychoses, without general febrile manifestations. To this class belong the majority of psychoses of pregnancy and lactation and a certain proportion of those of childbed, in which weakening factors—such as loss of blood, etc.—act as the causative agents. 3: Intoxication psychoses, following eclampsia; or, exceptionally, in uræmia, without eclampsia. Psychoses following eclampsia are not uncommon, and generally appear early,—from the second to the fourth day, rarely later. The hallucinations are constant, the course afebrile, and the termination usually favorable. Rarely do the mental manifestations extend over several months. It is impossible to determine which class of cases of eclampsia are predisposed, or if prolonged unconsciousness is particularly dangerous, but the cause is undoubtedly to be found in intoxication,—the psychoses standing in close relation to the uræmic changes in the blood.

Séglas and Sollier⁸⁴ communicate the history of an interesting case in which the condition developed in a married woman aged 34, following the birth of her second child. Associated with the insanity was inability to stand or walk,—the astasia-abasia of Blocq,—although when in the recumbent position there was neither paralysis nor inco-ordination of movements. There was also a marked impairment of memory, so that the patient was unable to accomplish anything which she had formerly been accustomed to do. Her husband, who was a spiritualist, and believed in the transmigration of souls, thought that his wife's sufferings were in punishment of sins committed in a previous state of existence, and this delusion he had partially succeeded in communicating to the patient. Alexander¹⁶⁶ reports a case of post-eclamptic mania occurring in a I-para 17 years old. The primary cause was a nephritis of pregnancy in a person of congenital instability (father, a drunkard; mother, very hysterical). Selby⁸² saw a case ending fatally on the ninth day post-partum, forty-eight hours after the beginning of maniacal symptoms. There was a preceding period

of high temperature and rapid pulse, following a forceps-delivery, during which the perineum was slightly torn. MacEvitt¹⁵⁷ discusses the subject of puerperal insanity in a long and interesting paper, and reports a case, as does Cummings.⁵⁴⁷

A case of traumatic paralysis due to prolonged pressure during labor is recorded by Esson.²⁴ Following a labor lasting forty-eight hours the patient complained of coldness, weakness, and swelling in the right lower extremity. On examination, the flexors of the foot showed feeble action, the extensors no action whatever. The patient was able to flex the leg on the thigh and the thigh on the abdomen to a slight extent. Sensation over the entire leg was normal; over the sciatic foramen and the posterior portion of the ileum pressure elicited severe pain. Paresis of the sciatic and anterior crural nerves was found on the right side. The patient recovered the use of the leg in about four weeks. Tincture of nux vomica, 10 minims (0.65 gramme), twice daily, massage, and electricity were employed.

Puerperal Neuritis.—Tuilant²¹⁴⁴ recognizes two forms of neuritis,—a general and a local. The latter is represented by two types,—the arm type, which was described by Möbius (ANNUAL, 1891, vol. ii, K-11), and a leg type, which chiefly affects the external popliteal nerve and its branches. In all cases of local neuritis the disease begins some days after labor, often with fever, and usually with severe pains in arms or legs, and develops rapidly. Interference with sensation is less, and disappears sooner than the interference with motion. The muscles most affected waste, and undergo complete or partial degeneration. After a varying period, complete recovery, or recovery with defect, takes place. In the local condition the neuritis is possibly due to some poison introduced from without. In the general form of neuritis the condition begins during pregnancy, following persistent vomiting, and results in a general wasting of the muscles. Auto-infection has been suggested as a cause.

Puerperal Amaurosis.—Heavenridge⁵⁶ reports a case occurring in a I-para. For eight days before confinement the patient suffered from pain in the forehead and back of eyes, with symptoms of "gathering in the head," associated with a discharge of mucopurulent matter and blood from the nose. There was also continued nausea and vomiting. The labor was normal. The vomiting con-

tinued for about twelve hours after labor. The sight became "flickering," and culminated in total blindness about seven hours post-partum, the patient being unable to discern the bright flame of a lamp. At noon of the following day she could see very little, the other symptoms subsiding, while a tendency to flightiness and a craving for water developed. In the afternoon a slight improvement in the sight occurred, and continued during the next three days. Under cathartics, anodynes, and acetanilid the patient made a complete recovery. The action of the acetanilid was most rapid, as, thirty minutes after the first dose, there was improvement of sight, and full restoration of that function in an hour. The theory was entertained that the blindness was due to a congestion of the tubercula quadrigemina.

Puerperal Eclampsia.—Löhlein ⁸⁴ _{Sept. 19} furnishes some interesting statistics in regard to eclampsia, the result of an investigation of 52,328 cases of labor occurring within a period of 2 years. In this number there were 325 records of convulsions,—1 in 161; but the writer states that in maternities, where cases are, perhaps, more methodically treated, the ratio is 1 in 330.02 cases. The mortality was 19.38 per cent. Among 248 patients who survived the attacks, 54 subsequently developed other conditions; in 13 there were psychoses, generally ending in recovery; in 5 pneumonia developed; 3 had pleurisy; and in 22 kidney trouble persisted, 11 of these being chronic nephritis. In 71.1 per cent. of the above cases operative interference became necessary. This included 108 forceps deliveries, 19 versions, 13 operations to lessen the size of the child, 2 induced abortions, and 7 Cæsarian sections. Five of the latter were performed after the mother's death, with the result of delivering a living child; 1 was done on the moribund, and 1 with favorable outcome to both mother and child.

Palmer, ⁴²⁶ _{May} from the examination of the urine of pregnant women in the Cincinnati Hospital, arrived at the conclusion that albumen is present, at some time or in some degree, in about 50 per cent. of cases. This great frequency may be in part attributable to the fact that a large proportion of the pregnancies in that institution are illegitimate. Fehling ²¹⁴ _{Mar. 16} places the percentage of albumen in the urine of pregnant women at about 6 per cent., I-paræ and multiparæ showing a like frequency. Labor increases the amount to about 30 per cent. In the discussion on eclampsia

at the last meeting of the British Medical Association, Galabin² said that he thought the rarity of albuminuria following the convulsions of epilepsy a proof that that found in eclampsia could not be simply the result of the convulsions, but the convulsions would undoubtedly increase the circulatory embarrassment of the kidneys. From a study of 12 cases of eclampsia, Herman⁶ found that no direct effect was produced on the temperature by the fits. In all the cases seen at the beginning of the attack the quantity of urine was lessened, except in 2 instances,—one of which died, and in the other renal disease persisted after childbed. In all the cases the excretion of nitrogenous matter in the urine was absolutely diminished, and in most the percentage was also lessened. The urine was at one time nearly or quite solid with albumen; in 3 cases the fits appeared to increase the amount. The 2 cases in which the amount of paraglobulin was largest recovered; in the 3 in which it was smallest, 2 died and kidney disease persisted in the other. In all those which recovered the amount of urine rapidly increased, together with the amount of nitrogenous matter, while the albumen diminished, as a rule, some hours after the cessation of the fits. The increase of urine went on more rapidly after delivery in those cases in which the convulsions ceased before labor. Retinitis was present in 2 cases, both of which died. Graham⁶¹ calls particular attention to the part which the absorption of the soluble products of the intestine may play in eclampsia. This is especially dangerous if the kidneys are not sufficiently active to eliminate these products from the blood.

Pilliet¹⁰² has made 12 autopsies with reference to the liver of eclampatics. In all he found hæmorrhagic foci associated with complicated pathological changes. These foci bear a certain resemblance to those found in the kidney in scarlatinal and erysipelatous nephritis. As this condition was present in all of the cases examined, he maintains that it is pathognomonic of the condition, and must lead to a modification of the opinions and treatment of this grave disorder.

Schmorl⁶ has also found these foci in the livers of 15 cases of eclampsia. He divides them, according to their anatomical and histological characters, into hæmorrhagic and anaemic necroses. Changes in the kidneys, hæmorrhages in the brain, and, in 5 cases,

necrosis of the pancreas and heart were found. In all cases parenchymatous embolism existed, originating sometimes in the liver, sometimes in the kidneys or placenta. In 4 children of eclamptic mothers extensive parenchymatous changes were also found in the kidneys. Schmorl ascribes all these changes to some poison in the mother's blood, the source of which has not yet been discovered. Lubarsch ²¹⁴ _{Ap. 16} found infarcts of the liver occasioned by the occlusion of the vessels, the thrombi being formed of liver-cells, hyaline, and blood-plaques. Multiple haemorrhages occurred in the kidneys, stomach, large intestine, the endocardium, and pericardium. In the lungs there were haemorrhages and haemorrhagic infarcts; in the brain, haemorrhages of the cortex and pia. The kidneys contained liver-cell emboli and the lungs blood-plaque thrombi. Besides these, in both lungs and kidneys there existed a slight degree of fatty embolism. Favre ²⁰ _{B. 122, p. 476} made cultures from the white infarcts found in the placentas of eclamptics, and obtained a micrococcus 0.7 to 0.8 micromillimetre in size. The cultures injected into rabbits produced variations of temperature, —generally lowering. If young cultures were used severe clonic convulsions, especially marked in the anterior extremities, were rapidly developed. These were followed by severe tetanic convulsions, with opisthotonus, the muscles of the face and ears participating. Favre concludes that this micrococcus is capable of producing the nephritis of pregnancy as well as the eclamptic fits. In the researches of Pilliet and Lubarsch, just alluded to, the most careful investigation failed to detect the presence of micro-organisms.

Herff ²¹ states that the eclampsia symptom-complex is dependent on a peculiar irritation change in the psycho-motor centres of the cerebral cortex (subcortical centres), —the eclampsia irritation zone. This zone develops during gestation on an existing disposition, which may be either congenital or acquired, as in uræmia, lead and alcohol poisoning, infection, etc. In other cases it is due to the physiological stimulus of pregnancy. The symptom-complex may be the result of disease in various organs. The physiological stimulus of pregnancy very rarely of itself is sufficient to call out the fits (eclampsia gestationes), but these are due to the participation of some other cause, which of itself is inadequate to set free the paroxysms. Frequently there is associ-

ated a mild grade of uræmic intoxication, which gives rise to the necessary force in production of the convulsions. Bidon¹⁶ states that the convulsions of eclampsia generally produce a certain clouding of the intellect, the psychic disturbance after repeated fits being very marked. Gradually memory returns, but remains faulty for a long time. Some cases show a defective memory limited to single words, dates, and figures; or as to the occurrence of the accouchement, in part or the whole; or of the time preceding labor. In others the amnesia is much more complete.

In a case reported by Loviot¹⁹¹ the convulsions came on several hours after delivery. The patient also developed a mild septicæmia, and twenty-one days post-partum had a slight phlebitis. Mason¹⁹² relates the occurrence of convulsions in both mother and child. Ellingwood¹⁹³ saw a case in which acute nephritis developed suddenly the twelfth day after labor. The urine was found loaded with albumen, and four or five times the normal amount of uric acid was present. Any measures taken to neutralize this excess of acid caused an immediate increase in the quantity of albumen excreted. Davis¹⁹⁴ records a fatal case of eclampsia, associated with multiple atheroma, in an Italian woman, twelve days after labor.

Treatment—Ward²⁰ is undoubtedly correct in the statement that the convulsions occurring before, during, and after labor call for different treatment; but, as Wright⁷⁷ observes, it makes little difference at what period the seizures begin, efforts at elimination of the poison in the system should be paramount to everything else in the treatment of the condition. The practice of administering chloroform by inhalation in eclampsia has received the attention of Remy,¹⁸⁴ who concludes, from his observations, that the control of the convulsions by this means may render subsequent fits more severe, and might then, in the perturbed state of the nervous system, give rise to what in surgery is called primary syncope. He believes that caution should be observed in the administration of chloroform when the fit is on, as it may prove dangerous. Two fatal cases from this cause are reported. Wright⁷⁷ also declares that, in his hands, chloroform has done no good. Tyson⁴⁰ says that, unless the physician is sure of the form of kidney disease present, morphine had best not be used. Cases of parenchymatous and tubal nephritis (and the majority of cases of

Bright's disease in pregnancy are such) bear morphine tolerably well, but the interstitial form does not. Hirst⁴⁰ advocates chloral hydrate, and Goodell⁴⁰ believes it to be useful in the majority of cases. Dubost²¹² considers chloral a specific. Perron²¹¹ recommends the hypodermatic injection of ether. In a semi-comatose case, in which chloral and bromide were not retained by enema, Miller⁹ passed a nasal tube (soft-rubber catheter), and, by means of a small stomach-pump, forced the remedy, together with a quart of water, into the stomach. Palmer⁶ treated a case, in which convulsions occurred twice during the same pregnancy, successfully by antipyrin. Robert Barnes,⁶ in commenting on this case, suggests that had the sphygmograph been used during and after the fits, and after the administration of the antipyrin, some valuable evidence of the action of this medicine might have been obtained. Strizovére²⁴ treated 10 cases of eclampsia by hypodermatic injections of hypochlorate of pilocarpine, with recovery of all. A solution of 1 grain (0.065 gramme) to the drachm (3.89 grammes) of water was used and a syringeful given, and repeated every twenty minutes, according to the case. He states that cardiac weakness does not contra-indicate the use of the remedy. Contracted pupils indicate that the morbid process has not subsided, and that more convulsions are imminent. Smits²⁵⁴ cured a case by large doses of calomel. Frey⁸⁰ calls attention to a very important point,—that in cases of eclampsia following delivery the impaired function of the kidneys greatly increases the danger of poisoning by bichloride and carbolic lotions when used for intra-uterine injection.

The diet in eclampsia has been studied by Dubost,²¹² who finds that milk is the diet *par excellence* in this condition and as a prophylactic, and believes that under its use eclampsia should become of very infrequent occurrence.

Operative Treatment.—Goodell⁴⁰ advises venesection in cases of violent headache and dimness, or other disturbance of vision, in albuminuric patients. Bleeding is also spoken of with favor by Kelly,¹⁰⁵ Bryce,¹⁹⁶ and Swayne.¹⁸¹ Egbert¹⁹² finds that the evacuation of the liquor amnii relieves the heart and kidneys much after the fashion of blood-letting,—by reducing pressure. Jewett¹⁵⁷ cites a case in which podalic version was performed and a living child delivered just as the mother was expiring. Delivery by the

feet in such cases is often accomplished with surprising facility. E. H. Richardson²⁰⁷ believes that it is a very great responsibility for the physician to fold his hands and content himself by instituting an expectant plan of treatment in these cases. The only adequate measure is a thorough evacuation of the uterus by artificial premature delivery.

Haultain²⁰⁸ argues that, as uterine contractions appear to be a potent factor in the production of the convulsions, after the patient is put in good condition by the use of the usual remedies, artificial abortion or premature labor should be induced. Simpson and Milne Murray, in discussing this paper, agreed to this line of treatment. Lauder²⁰⁹ saved 4 mothers and 3 viable children by inducing labor when other means had failed to give relief. In desperate cases Fehling²¹⁰ also recommends this course.

Kaltenbach and Gusserow²¹¹ favor Cæsarian section; Chrobak thinks that the indications cannot yet be formulated; Müller considers it justifiable if the labor cannot be terminated rapidly in any other way, and Löhlein declares that section is very rarely indicated in eclampsia. Swiecicki²¹² reports an unfavorable case treated by section as advocated by Halbertsma.

Care of the Bladder.—Coe²¹³ calls attention to the fact that writers on obstetrics lay but slight stress on the disturbances of the bladder in the parturient female, and points out that slight affections of this viscus may give rise to painful micturition and vesical tenesmus. The treatment of these conditions may be general, local, or both, but they usually yield to the milder methods. Norment²¹⁴ relieved a case of cystitis in a large cystocele by the irrigation of the bladder with saline solution,—teaspoonful of sodium chloride to the quart (litre) of water,—followed by injections of black-tea decoction.

Phlegmasia Dolens.—Miller²¹⁵ recommends cold-water compresses and the ice-bag in this condition to control pain and relieve inflammation. Fear²¹⁶ believes that cannabis Indica is the remedy *par excellence* in this disease.

The Puerperal Breast.—Waugh²¹⁷ saw a small abscess develop close to the nipple in the second month post-partum, evidently due to the transfer of septic material from styes, from which the mother was suffering, to the part. The baby appeared to have gotten some of the pus into the left nasal duct, for his left eye.

became inflamed and suppuration appeared in the orbit, forcing the eye almost out of the socket, and discharging from the nose and through the gums into the mouth. Then the mother's other breast became affected and a similar abscess formed. Under antiseptic treatment, including peroxide of hydrogen, recovery resulted.

In caring for the breasts, Charles Meigs Wilson⁷⁸⁰ keeps the patient's bowels open from the second day by small repeated doses of compound licorice-powder, or pil. rhei comp. The nipple is washed in warm water before and after nursing and smeared with castor-oil. If the nipple becomes chapped or excoriated, the cracks are touched with 10-per-cent. nitrate-of-silver solution once a day. Overfilling of the glands is treated by restricted liquid diet, gentle saline laxatives, and firm compression by bandages over lower third of breasts. Tarnier³⁴² saw a mammary abscess develop from infection from a lochial pad, which the patient took from the vulva and applied to the breasts as a protection from cold.

Guibert²¹¹,^{Aug.} finds that antipyrin renders marked service in arresting the secretion of milk in newly-delivered women, provided the kidneys are normal. The drug is administered in 4-grain capsules (0.26 gramme), every two hours, for two days, or until 60 grains (3.89 grammes) have been taken,—a quantity sufficient usually to produce the desired effect.

B. C. Hirst¹¹² says that in the treatment of fissured nipple, when the cracks are at all extensive, the ordinary remedies recommended from time to time have been found more or less unsatisfactory. Painting with tincture of benzoin, for instance, while an excellent procedure for small superficial cracks of the nipple, is perfectly worthless in more advanced cases. He has found, in hospital and private practice, that excellent results can be secured in bad cases by the application of an ointment made up of equal parts of castor-oil and subnitrate of bismuth. This mixture makes a very smooth, soft ointment, which relieves the pain and is an excellent protective to the part. Before application, the nipple and surrounding skin should be carefully cleansed and disinfected, and then the ointment should be smeared on plentifully. If it is necessary for the child to nurse from the affected nipple, it can be allowed to do so without the necessity of removing the ointment from the nipple, as must be done if tannic acid or the salts of lead

are used. This is a serious disadvantage of many forms of treatment recommended for fissured nipple, for the irritation of removing the substance employed as a local sedative neutralizes its action.

For the engorgement and pain in the mammary gland itself, which so often accompanies fissured nipple, Hirst has obtained excellent results from the use of an application of lead-water and laudanum, which is applied by means of a cloth covering the whole breast, renewed at frequent intervals and kept in place by a suitable mammary binder, either that recommended by Richardson or the Murphy bandage. This not only retains the dressing, but supports the breast and exercises even pressure upon it. With this treatment the development of mammary abscess is a rare event. If the child can be nursed from the other breast alone it is safer, he thinks, to draw the milk from the affected gland by means of a breast-pump until the cure is almost complete. If it is necessary that the child should nurse from the cracked nipple, a glass nipple-shield with a rubber tip must be employed.

Jorisseune, of Liége, Belgium,²⁴⁶ had under his care a patient of slightly tuberculous aspect ²⁴⁷ who, on absenting herself from her infant seven and a half hours, found that her milk was horribly fetid,—like rotten eggs. It made her feel ill, and her relatives could not stay in the same room with her. Yet the infant sucked with avidity; it was violently sick, however. Next day the milk was sweet, and the child and the mother were quite well. The breasts showed no sign of hardness, engorgement, etc. The nipples were healthy. The patient told Jorisseune that on several previous occasions she had noticed that when she delayed giving the child the breast at the usual times the milk became fetid. He had no further opportunity of observing this putrefaction of milk, as it did not recur. The patient was red-haired; but he has carefully examined the milk of many red-haired women since 1874, and failed to find that it showed any special tendency to putrefy, or even to turn sour, in the open air or in a close room, more quickly than milk from a black- or fair-haired woman. The avidity with which the infant imbibed the putrid milk was remarkable; its stomach was more sensitive than its nose and tongue.

DISEASES OF THE NEWBORN.

BY ANDREW F. CURRIER, M.D.,
NEW YORK.

THE literature of this subject is unusually rich and varied this year. Certainly, not the least of the achievements of modern scientific medicine is the demonstration that human beings at the earliest period of their existence are not only subject to a great variety of ills, but also that many of them are quite amenable to relief. The gain to humanity from this development is incalculable, and the concrete evidence of it is the increase in the intelligent care which is bestowed upon the newborn, and the corresponding decrease in infantile mortality wherever scientific medicine has established itself. As an appropriate introduction to this article, the beautiful plates from Ballantyne's paper³⁸ on "The Relations of the Abdominal Viscera in the Infant" are introduced, the conclusions of his paper being as follow: 1. The relations of the abdominal viscera, liver, stomach, spleen, etc., to each other and to the bony landmarks, and more especially the vertebral column,

Description of Plates.—Plate I. Mesial Sagittal Section of Newborn Infant. In the upper part of the region of the head the section has passed slightly to the right of the middle line, leaving the *falk cerebri* unexposed. *a*, Anterior Fontanelle; *b*, Presphenoid; *c*, Thyroid Cartilage of Larynx; *d*, Tongue; *e*, Left Innominate Vein; *f*, Thymus Gland; *g*, Tricuspid Opening in the Heart; *h*, The Liver; *i*, The Pylorus; *k*, Transverse Colon; *l*, The Pancreas; *m*, Lobus Spigelii of Liver; *n*, First Lumbar Vertebra; *o*, Left Auricle; *p*, Aorta; *r*, Trachea; *s*, Seventh Cervical Vertebra; *t*, The Pharynx; *v*, Cerebellum; *w*, Posterior Fontanelle. Plate II. Left Lateral Vertical Section of Newborn Infant. Right face of Section seen, five-eighths natural size. *a*, Anterior Fontanelle; *b*, Posterior Fontanelle; *c*, Cerebellum; *d*, Thymus Gland; *e*, Left Lung, Upper and Lower Lobes; *f*, Spleen; *g*, Left Suprarenal Capsule; *h*, Left Kidney; *i*, Left Psoas Muscle; *j*, Twelfth Rib; *k*, Umbilical Cord; *l*, Transverse Colon; *m*, Liver, Left Lobe; *n*, Stomach; *o*, Left Ventricle of Heart; *p*, Right Ventricle of Heart; *r*, Left Sucking-pad; *s*, Left Malar Bone; *t*, Left Eye. Plate III. Coronal Sections of Thorax and Abdomen of Newborn Infant, five-eighths natural size. Fig. 1. Coronal Section of Thorax and Abdomen in Plane of Stomach. *a*, Sternum, Third Ossific Centre; *b*, Clot in Right Auricle of Heart; *c*, Right Ventricle of Heart; *d*, Left Lobe of Liver; *e*, Longitudinal Fissure of Liver; *f*, Stomach; *g*, Spleen; *h*, Transverse Colon; *i*, Position of Umbilicus; *k*, Sigmoid Flexure; *l*, Cæcum; *m*, Duodenum; *n*, Right Lobe of Liver; *o*, Right Lung, Middle

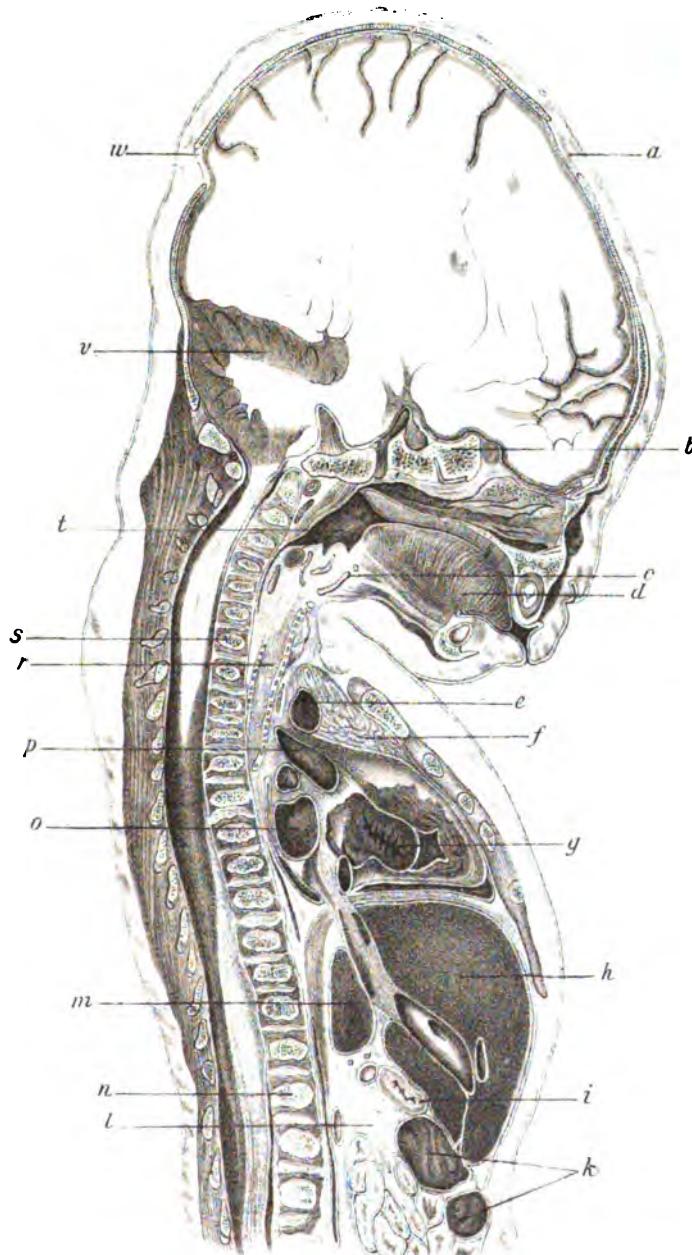
Lobe; *p*, Umbilical Vein; *r*, Fourth Costal Cartilage (right). Fig. 2. Coronal Section of Thorax and Abdomen in plane posterior to that in Fig. 1. *a*, Thymus Gland; *b*, Left Lung, Upper Lobe; *c*, Left Ventricle of Heart; *d*, Left Lobe of Liver; *e*, Hypertrophied Spleen; *f*, Accessory Spleen; *g*, Left Kidney; *h*, Left Iliac Crest; *i*, Right Kidney; *l*, Vena Cava Inferior; *k*, Right Lobe of Liver; *m*, Stomach near Fundus; *n*, Diaphragm; *o*, Right Lung, Middle Lobe; *p*, Opening of Superior Vena Cava; *r*, Coracoid Process; *s*, Manubrium Sterni. Plate IV. Dissectional View of Abdominal Viscera in Newborn Infant, two-thirds natural size. The liver has been drawn upward, in order to show the position and form of the stomach. The transparent character of the great omentum is well displayed, and the green color of the meconium in the transverse colon can be seen shining through the omentum. The umbilical vein is shown passing upward in the falciform ligament of the liver.

have been pointed out, so as to lay a sure foundation for their clinical investigation by means of palpation and percussion. 2. The form and dimensions of the liver, stomach, spleen, and suprarenal capsules have been stated, so as to throw some light upon certain peculiarities in the infantile economy, *e.g.*, the ease with which infants vomit, the common occurrence of prolapsus recti. 3. The frequency of an abnormal disposition of the large intestine, especially of the sigmoid flexure, has been insisted upon as giving a clue to the cause of some cases of obstinate constipation in infants, and as affording a warning to surgeons who may have to open the abdomen for imperforate anus, etc. 4. The whole subject has been investigated by the frozen sectional method, so as to insure the least possible disturbance of relations.

The same author³⁶ has also contributed a paper containing illustrations of an infant-weigher. The practical importance of obtaining accurate knowledge of the variations in weight of sickly infants during the first few weeks or months of life suggests the necessity of such an apparatus as Ballantyne has described.

Stuart³⁷ sums up his article on the care of the newly born as follows: The young life should be guarded from shock in every possible way by every possible care. It should be taught one thing at a time. It is enough that its first hours should be given only to breathing, and a warmed air at that. It should be kept warm at all times. It should be washed quickly and tenderly. It should be fed regularly and not haphazard, whenever it stirs or cries.

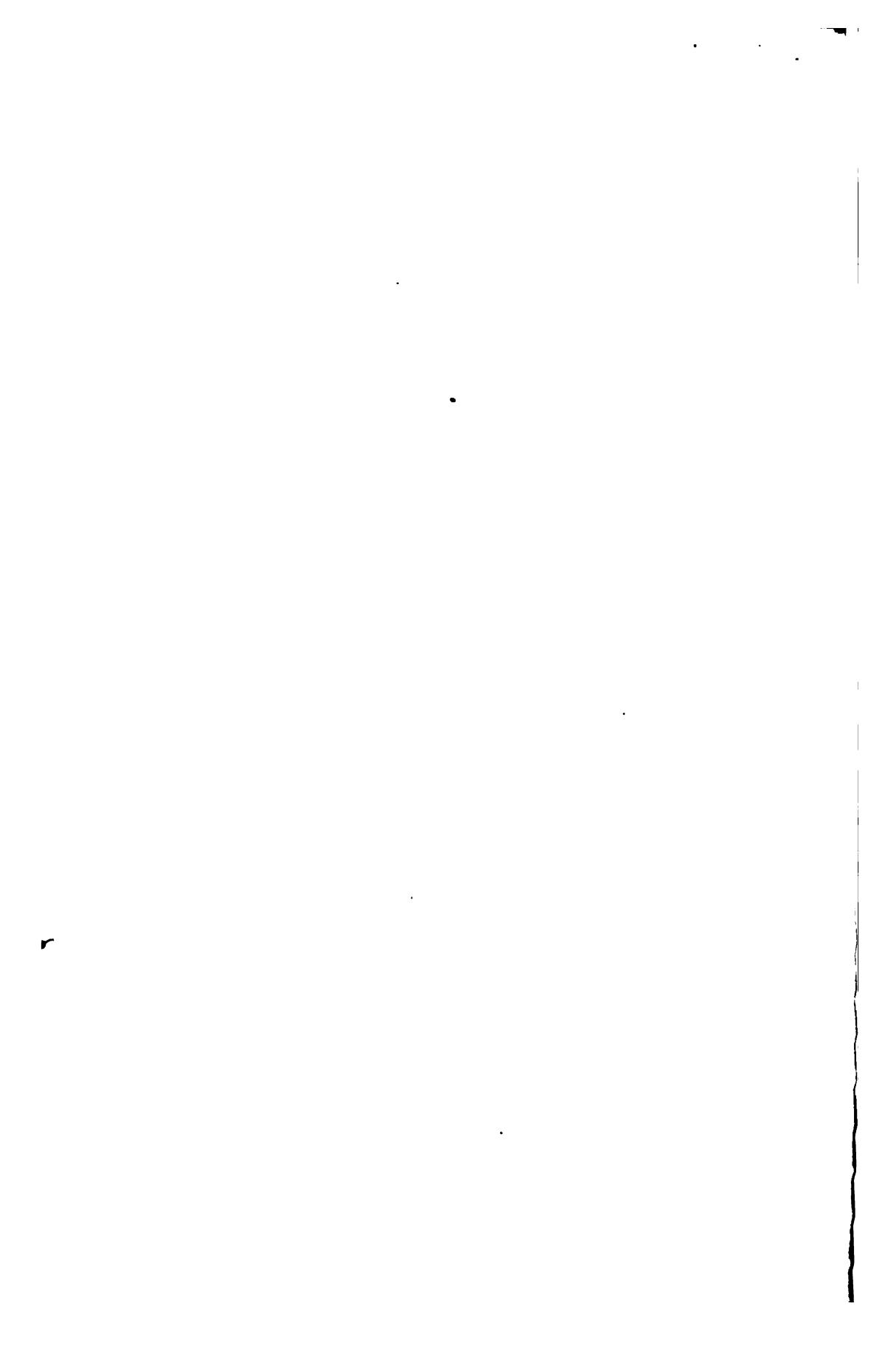
The question of the passage of pathogenic micro-organisms from mother to fetus, which has a decided bearing upon the well-being and even the life of the newborn infant, has been discussed by Simon.⁵¹ His conclusions coincide with those of Birch-Hirschfeld, who regards the transmission of the splenic-fever bacillus as

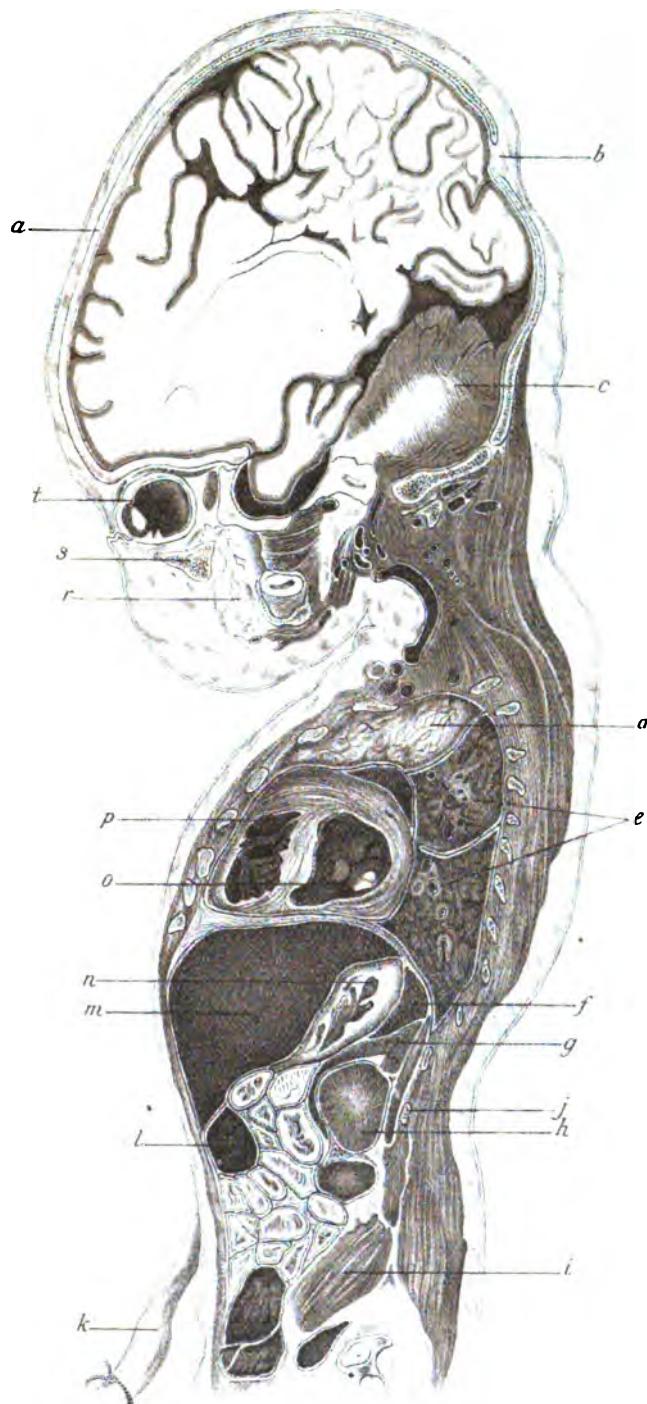


Abdominal Viscera in the Infant. (Ballantyne)

Medial Sagittal Section (1/2 Natural Size.)

Edinburgh Medical Journal.





Abdominal Viscera in the Infant (Ballantyne)

Left Lateral Sagittal Section (5/8 Natural Size.)

Edinburgh Medical Journal.

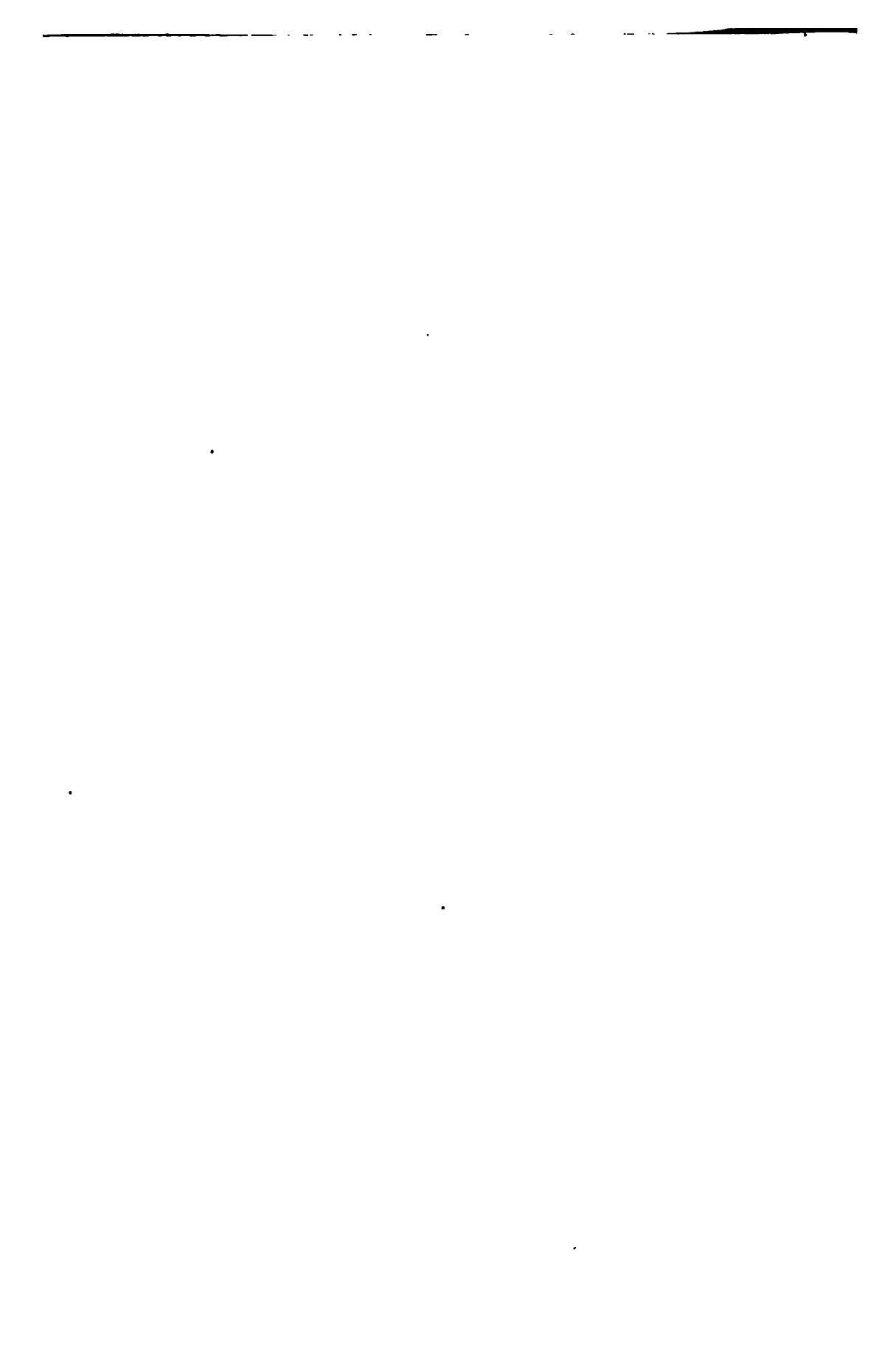
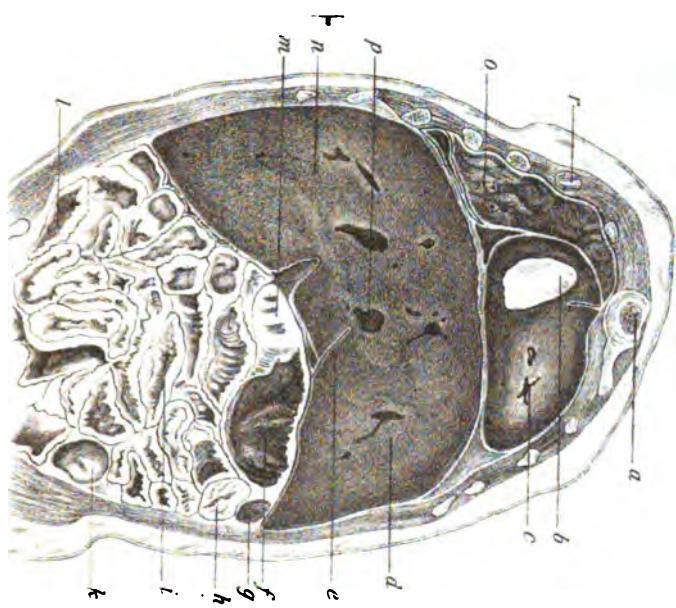
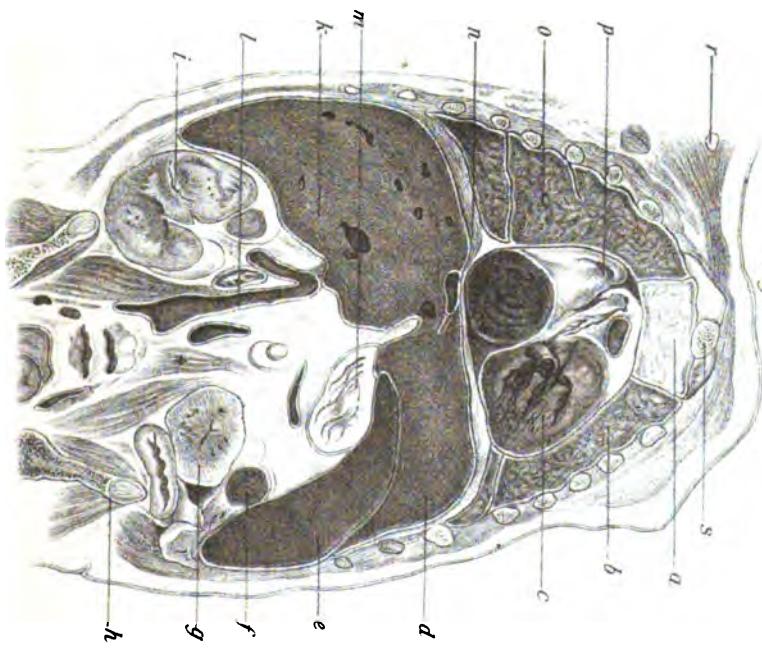


Fig. 1



Coronal Section of Thorax and Abdomen 15th Natural Size.

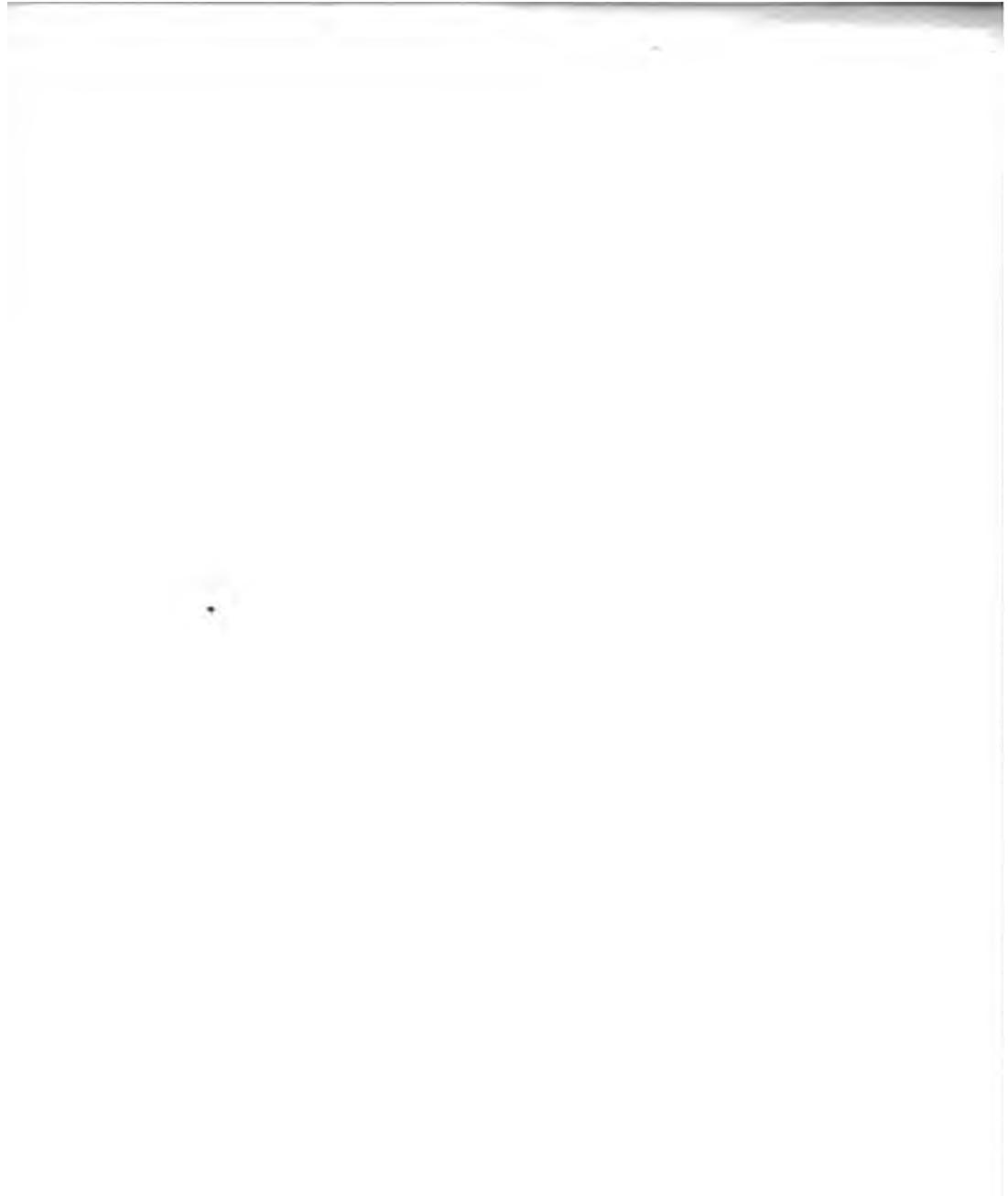
Fig. 2

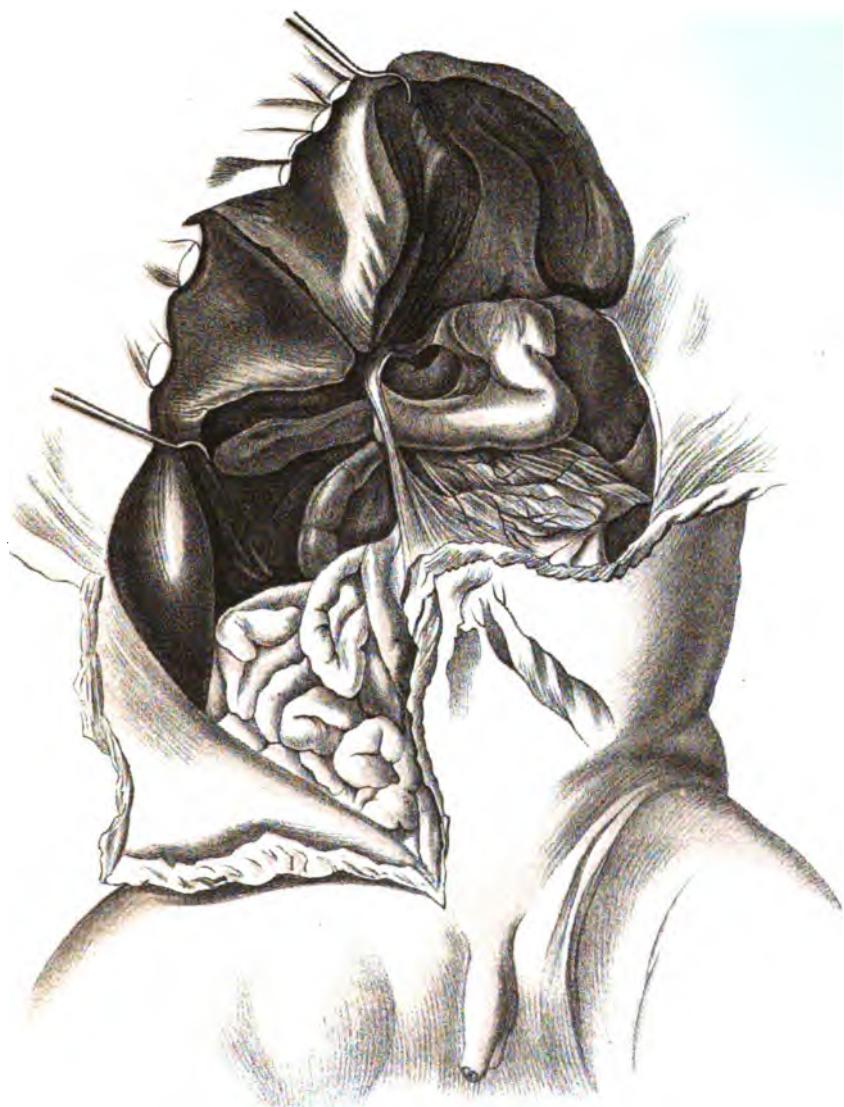


Coronal Section of Thorax and Abdomen 15th Natural Size, posterior to Fig. 1.

Abdominal Viscera in the Infant. (Ballantyne)

Edinburgh Medical Journal.





Abdominal Viscera in the Infant. (Ballantyne)

Dissectional View (2/3 Natural Size.)

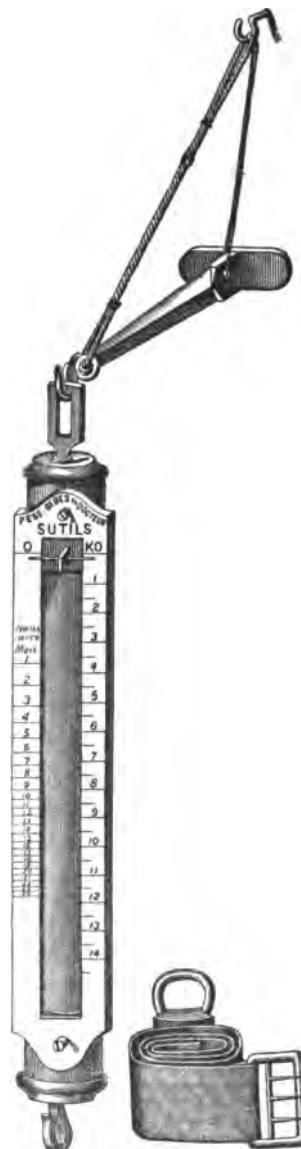
Edinburgh Medical Journal.



proven. Simon experimented with white mice, puppies, and guinea-pigs, not using cultures, but seeking to follow the progress of the micro-organism from mother to foetus with the microscope. In studying puppies, the uterus of the mother was imbedded, cut in sections, and each section studied. In the membranes, including that which contained the amniotic fluid and the funis, bacilli were found in great numbers, having apparently reached that location by way of the placenta. The foetus had bacilli upon its surface and in the tissues of the abdominal wall. Infection of the foetus in general was not frequent, perhaps because the conditions of the foetal blood were unfavorable to the life conditions of the bacilli. Three stages of the disease process in anthrax were clearly observed. When it had lasted the ordinary period of time, the maternal portion of the placenta was found abundantly supplied with bacilli, and so were the membranes, amniotic fluid, and superficial portion of the foetus. If the disease were of longer duration there were bacilli in the foetus. Other questions which were of importance in this study were the greater or lesser resistance of the maternal compared with the foetal tissue, the virulence of the infecting poison, the condition and disposition of the leucocytes, etc.

DISEASES OF THE SKIN.

Pemphigus.—Of the diseases of the skin which appear as epidemics among the newly born, pemphigus may be mentioned, such epidemics having been observed in 1870 by Olshausen, in 1872



BALLANTYNE INFANT-WEIGHER.
(*Edinburgh Medical Journal.*)

by Ahlsfeld, in 1873 by Moldenhauer, and in the past year by Almquist,³ at Göteborg, 134 cases being seen in the course of three and a half months. The vesicles developed rapidly upon the thighs, abdomen, neck, and head. The fluid was first clear serum, then pus, and finally a crust was formed. None of the cases were fatal, neither was there coincident ophthalmia in the children nor puerperal disease in the mothers. The organism in the fluid was a diplococcus, which resembled the staphylococcus pyogenes aureus, but the results were not such as are produced by that microbe. The disease was probably transmitted by midwives. Such epidemics emphasize the importance of cleanliness on the part of the attendants and the surroundings of infants.

Vaccination.—Wolff,³⁰⁶ after carefully vaccinating a large number of newborn infants and watching the results, found that inoculation usually resulted without very great constitutional disturbance. Inasmuch as many of the fatal cases of small-pox occur during the first three months of life, it would seem to him desirable that all newborn infants should be vaccinated with fresh calf-lymph, excepting those who are premature or enfeebled by disease. He did not think that vaccination tended to bring out a latent syphilis, as has been asserted by some writers.

Erysipelas.—Morel¹¹⁸ studied 5 cases of erysipelas in the newborn, 4 of them being fatal on the second or third day. In the blood from the heart there were a few streptococci. The serum of the blood taken from the vicinity of the diseased tissues contained streptococci in abundance. The lesions in this disease are nearly the same as in adults, the skin and the subcutaneous layer being almost normal. There were no wandering cells and no swelling of the fixed cells.

WRYNECK.

This condition in the newborn is not infrequent. Very excellent observers, including Dieffenbach, Stromeyer, and, more recently, Ruge, have considered it as of traumatic origin, or as proceeding from violence during parturition. It would seem to be, primarily at least, an induration of the sterno-mastoid muscle, without inflammatory elements; hence Quisling's term, myositis sterno-cleido-mastoidea,¹⁵⁸ is apt to be misleading, unless a given case is watched very closely for symptoms of inflammation. Quis-

ling has reported 3 cases during the past year. Parker⁵¹ has reported 2 cases. The first was a female delivered with forceps applied to the after-coming head, the presentation being dorso-anterior breech. The induration of the sterno-mastoid muscle (on the left side) was not observed until the twenty-sixth day, and it yielded to gentle friction after a few weeks. The second case was also one in which there had been a breech presentation, with forcible extraction. The induration appeared on the right side on the twentieth day, and disappeared after six weeks. Parker thinks that force enough was used in both cases to tear more or fewer of the fibres of the sterno-mastoid, and thus cause inflammatory effusion with subsequent cicatricial contraction. I cannot agree with him. If there were inflammation, it is in the highest degree improbable that the children would have shown no evidence of it during the three weeks before the induration appeared. If there were effusion into or around the sheath of the muscle, why should it not have manifested itself very quickly by pain, swelling, and distortion of the head? The conclusions of Peterson⁹⁹⁹ upon this subject, which seem to us more probable and credible, are as follow: 1. There is no authentic instance in literature of the occurrence of wryneck from the rupture of muscular tissue during parturition. 2. Clinical experience and negative results from experiments on animals show that wryneck does not come from the rupture of muscular tissue. 3. Shortening of structure, which produces wryneck, may occur during foetal life. 4. Continued contact of the points of origin and attachments of a growing muscle will cause shortening of that muscle. 5. The intra-uterine origin, the frequent occurring of this condition on the right side, in connection with breech-presentations and difficult labors, show that it is due to an abnormal condition of the amnion. 6. Stromeyer's teaching, that it is of traumatic origin, is no longer tenable. 7. Congenital wryneck is never due to fault on the part of the *accoucheur* or the midwife.

THE NAVEL.

The importance of this structure in the newborn can hardly be overestimated. Its well-being is vital to the condition of the child, and investigators have not been backward in increasing the attention with which it has long been regarded, as bacteriology intensifies its importance as a mode of ingress for various harmful

media. The means of treating the stump of the umbilical cord vary widely. When we see the total neglect of the stump among savages and barbarians, or the use of means which we would expect to be followed by a righteous retribution in the shape of sepsis and death, if employed upon the babies of civilized communities, we hesitate to pin our faith to any one system or method of treatment. The essence of all correct treatment, among civilized beings, at least, is cleanliness, and we can modify it to suit our fancy or the fancy of others. Godlewski²⁶ gives a list of ten different styles of dressing, all of which, with the exception of the plaster-of-Paris method, were more or less objectionable. He concludes (1) that hygroscopic powders in general afford the best materials for dressing the cord; (2) that Sütüghin's method should be decidedly preferred to all others, since plaster of Paris fully absorbs moisture from the tissues of the stump, induces rapid mummification of the same, and prevents the ingress and proliferation of microbes. As to the time for the dropping of the stump of the umbilical cord, Copasso, ²⁷² in a series of observations, including 167 children, observed the fact that it might occur between the third and the tenth days, though it occurred most frequently on the fifth.

Tumors.—Tumors of the umbilical cord are decided rarities, though one can easily imagine that hæmatoma may result from violence. In a case narrated by Bussmann, ²⁸ there was a hæmatoma as large as an apple, two inches from the navel, upon the cord of a younger twin. The child was macerated, the amniotic fluid was chocolate color, and the tumor was of doughy consistency. The cord was tightly twisted close to the navel, the vessels were obliterated between the tumor and the navel, and were also plugged on the placental side of the tumor. The hæmatoma was thus caused by torsion of the cord, the vein first giving way, the tumor forming, and the other vessels becoming plugged. Kauffmann ²⁹ reports a case in which the tumor appeared to have sprung from the navel-ring. It was as large as an apple at birth, bled rather freely, and was removed on the sixth day. It was red in color and dry upon the surface, but was abundantly provided with large vessels; in fact, an examination of its structure showed that it was a *myxosarcoma teleangiectodes*. Umbilical tumors of rapid growth, and consequent low organization,

have also been reported by Preisz ³⁶⁶ and by Hirst. ²³ In the latter case there was a spur-like projection from the umbilical stump, $\frac{1}{2}$ inch long and $\frac{1}{2}$ inch in diameter, white, insensitive, and tapering. It was removed, and found to be neither a granuloma nor an enterotermoma, but was composed of young connective-tissue cells, with an adequate blood-supply.

Hæmorrhage.—An interesting case of hæmorrhage from the navel is reported by Casella, ⁷⁶² the child being a well-developed 8-month infant of a syphilitic mother. The bleeding began on the eighth day, and was continuous. On the tenth day petechiæ appeared over the entire body, and in some locations became confluent. On the fifteenth a swelling appeared on the left side of the face, from which blood oozed. The child died on the eighteenth day.

Knots.—Knots in the umbilical cord are said to occur in about 1 per cent. of all births. Their importance is very great; in fact, they not infrequently cause death. Lynckner ² reports 3 cases, in all of which the child was living. Such knots are probably caused by the evolutions of the child in the liquor amnii through loops produced by its own movements. Cazeaux ³ thinks that they are never the cause of death, but Le Four ⁸ believes that they may produce such a result, either by offering a simple mechanical obstacle to the circulation in the funis, or by causing thrombosis as the result of changes produced in the circulation.

Sepsis.—Eröss ³⁶⁶ made a study of the temperature of 1000 infants born in the obstetric clinic at Buda-Pesth, and concluded that septic infection from the navel, in connection with detachment of the umbilical cord, was a frequent cause of fever, and an important factor in infantile mortality. Fever was present in 450 of the 1000 cases, and in 81 it was due to gangrene of the cord, in 55 to sloughing, in 55 to protruding stump, in 24 to omphalitis, in 3 to ulceration, and in 2 to gangrene of the umbilicus. Death resulted in 8 of the cases.

An interesting investigation, made by Herzog, ⁶⁹ shows that the process which has usually been considered merely a retraction of the umbilical vessels within their sheaths, after the falling of the stump, is really a degenerative process, and that this is due to a cessation of function, an atrophy of inactivity, accompanied by a process of obliteration.

THE EYES.

Conjunctititis.—One of the most important, as well as one of the most common, diseases affecting the eyes of the newborn is conjunctivitis, or blennorrhœa. When we realize that a large percentage of the blind have lost their sight from this cause, and that it is a preventable or manageable disease if attended to sufficiently early, it is not easy to consider any attention which may be given to the subject as excessive.

Keyser²⁰, describes the disease in all its well-known features, dwelling upon the extreme results which may occur, and the proper way of meeting them. Dehenne¹⁴ advises the use of ice or of cotton soaked in ice-water to the lids after the disease has developed, cleansing of the lids frequently with absorbent cotton moistened with Van Swieten's solution, and instillation morning and evening of 4 or 5 drops of the following:—

B Eserini sulph., neutr., 0.10 grammie (1½ grains).
Aqua destil., 20.00 grammes (5½ drachms).

Once a day the conjunctival surface of the lids may be gently touched with the following solution:—

B Argenti nitr. crystal., 0.50 grammie (7½ grains).
Aqua destil., 20.00 grammes (5½ drachms).

De Lapersonne²⁴, recommends a treatment essentially the same as the foregoing. Schmidt-Rimpler²⁴ has called attention to the fact that blennorrhœa from gonococci in newborn infants is not always a serious condition, and, furthermore, that the same disease without gonococci may often prove serious. He believes that it is not followed by severe ocular lesions so often as in the adult, and that it will usually yield to regular treatment. As a prophylactic means, he prefers officinal chlorine-water for instillation, rather than nitrate-of-silver solution. It should be instilled twice daily, and in the interval the eyes should be covered with pledges of absorbent cotton, moistened with a 2-per-cent. solution of boric acid.

CONSTITUTIONAL DISEASES.

Syphilis.—Of this class of diseases syphilis is ever common and destructive. Edwards¹⁶⁴ sums up a consideration of the subject as follows: 1. A child who is syphilitic or suspected of syphilis should be nursed by its mother. 2. If this is impossible, it should

suckle a she-ass, and receive specific treatment at the same time. 3. Under no pretext should it be suckled by a hired wet-nurse, unless the latter is syphilitic also. 4. Among nurses it should be well understood that ulcerations, however small, on the lips of the cervix, catarrh of the cervix, irritation of the skin of the inside of the thighs, should receive proper attention. 5. A weak or cachectic child, especially if under 6 months of age, should never be used in arm-to-arm vaccination.

Eröss,¹ studied the variations of temperature in 5 cases of congenital syphilis, and found that fever might accompany the development of the skin-lesions the same as in adults. His conclusions are the following: 1. Fever begins with the appearance of the lesions upon the skin and ends with their disappearance. In the 5 cases which were particularly studied in this connection, there was no co-existing disease. 2. The fever may be continuous or intermittent. In 2 of the cases there were remissions; in the others there were none. 3. The fever in such cases is not very high, usually ranging from 38° to 39° C. (100.4° to 102.2° F.). In 1 fatal case it reached 41° C. (105.8° F.), rising with the development of the eruption. 4. In 3 cases in which the eruption was present at birth, fever came with the access of a new eruption. In cases in which the eruption develops *in utero*, it is probably attended by fever the same as in extra-uterine cases. Fever is not infrequently seen in the infant at birth as the result of other than syphilitic disease. The same author, Eröss,¹ has studied a kindred subject, namely, the effect of various antipyretics upon very young infants, the means experimented with being antipyrin, quinine, and warm baths. Among 956 children, there was elevation of temperature during the first ten days of life with 431; with 145 it was of short duration; in the others it continued several days. In 184 it was continuous; in most of the others it was irregular. In 44 per cent. of cases it was caused by gastro-intestinal disorder, and in 34 per cent. by trouble at the umbilicus. Antipyrin was given in doses of 1 grain (0.065 gramme) to $2\frac{1}{4}$ grains (0.15 gramme), and the dose was repeated in an hour, if necessary. The maximum effect was usually produced in less than two hours, but reduction of temperature frequently lasted five hours. In addition, there was lowering of the respiration and pulse and diaphoresis. Quinine given in some-

what smaller doses produced similar results. Warm baths produced more favorable results than either of the drugs mentioned. The temperature of the bath should not be above 95° F. (35° C.); it should not be continued longer than ten minutes, and not longer than five minutes with delicate children. Sleeplessness and irritability quickly disappear under its influence, a refreshing sleep supervenes, and the general condition of the child is greatly improved.

Septicæmia.—Karlinski ⁸⁸ obtained colonies of staphylococcus pyogenes aureus, staphylococcus pyogenes albus, and staphylococcus pyogenes citreus from cultures of milk taken from a woman on the fourth day of puerperal infection. The child was removed from the breast the same day, but developed fever on the following day. Two days later there were parotiditis and intestinal catarrh, with febrile movement. On the tenth day the child died with peritonitis, pleurisy, gastro-enteritis, but no omphalitis. The venous blood and the contents of the ileum yielded the same micro-organisms as the milk of the mother. In the peritoneal exudate was found only the staphylococcus pyogenes albus. The septicæmia in this case was believed to have an intestinal origin. Rabbits and a bitch were inoculated with staphylococcus aureus after parturition in the veins and the mammary glands, and the microbes were recovered from the milk. The young animals, which were put to the breasts of their diseased mothers, died in four or five days from septicæmia, with diarrhœa and peritonitis. The micro-organisms were found in their blood, the contents of the intestines, and the spleen.

DISEASES OF THE LUNGS AND AIR-PASSAGES.

Nasal Polypi.—A case of congenital polypus of the nasal fossæ is reported by Le Roy, ¹⁵² who states that he finds no record of a similar case. The polypus was movable and almost filled the left nostril, interfering with respiration and alimentation. Dyspnoea and bronchitis compelled action, and it was removed with some difficulty by means of the polypotome and forceps. It was attached by a rather broad pedicle to the external wall of the nostril, near the entrance. As to the existence of such growths, there is little doubt that they are present congenitally in many cases. They have not been reported, because they have not been sought for,

and probably are seldom large enough at birth to cause much trouble in respiration or alimentation.

Gonorrhœal Stomatitis.—Gonorrhœa in the mouth of the newborn infant is not of common occurrence. Dohrn²⁴⁵ has observed 5 cases within the year. It may be well to describe one as a typical case, and as it might be insisted by some that the epithelium of the mucous membrane of the mouth is not attacked by the gonococcus. The child was 8 days old, and presented eroded patches upon the dorsum of the tongue, its alveolar borders, and the roof of the palate. It was also suffering with gonorrhœal ophthalmia, and the mother's genitals were similarly diseased. Gonococci were found in the mucous membrane of the mouth. In four weeks the erosions had cicatrized, and no other traces of the disease in that location remained. Rosinski⁶⁹ reports 2 cases of the same character.

Aphthæ.—Fränkel⁸¹⁹ _{July 18} differs from certain standard authors in his explanation of aphthous sore mouth. He regards it as an epithelial necrosis, due to the influence of certain microbes, thus permitting the penetration of other microbes. Among the latter may be mentioned the streptococci, and the resulting infection may become general. The etiology and prophylaxis of this condition is also discussed by Baum, ² _{Sept. 17} who believes that it is due to the friction exercised in cleansing the child's mouth. In 40 cases which he observed, in which there was the habit of scouring the infant's mouth at birth and after each nursing, he found aphthæ in 30, while in 50 other cases, in which this practice was omitted, there were no aphthæ. He thinks the teaching that the condition is due to sucking is no longer tenable. In 2 cases he found the mouth thus affected a few hours after birth, or before the children had been put to the breast.

Influenza.—Eight cases of influenza were observed by Strassmann³⁸³ _{B.I.B.1} during the epidemic in the winter of 1890. The symptoms were: restlessness, a greenish secretion in the nose, rapid respiration, snuffles, hoarseness, and, in some cases, cough. After two or three days there was sore mouth and constipation or diarrhoea. The temperature was lowered, in 1 case reaching 32.1° C. (87.5° F.) *per rectum*. Of course, this low temperature is accounted for by the depression of the vital energy which necessarily accompanied the disease. The youngest of the children was

3 days, the oldest 14 days old. In one of the cases a fatal pneumonia developed.

Spasm of the Glottis.—Löri⁸⁴ discusses this symptom, which occurs with many of the diseases common to the newborn. He observed it most frequently with rachitis and the diseases of the digestive organs. It never resulted fatally, and he was able to relieve it by allowing a drop of a 1-per-cent. solution of cocaine to pass down to the larynx through the nose.

Asphyxia.—A. Jacobi⁵¹ calls attention to the fact that many infants who are born asphyxiated are physically and mentally incapable of healthy and normal development, owing to the faults of structure. Not infrequently such children who are resuscitated after long-continued effort live only a few hours or days, or, if they survive, develop into idiocy or imbecility. Others are seriously injured by prolonged parturition. While it is admitted that the improper or unskillful use of the obstetric forceps produces results of this character in some instances, it is believed that they are oftener due to delay in the use of the forceps.

Mechanism of Respiration.—Careful investigations upon this subject have been made by Eckerlein, ³⁹³ which do not accord in all respects with those of Dohrn. (See ANNUAL of 1891, ii, L-14.) The significance of the pneumogastric nerves in the newborn has been experimentally studied by Heinrichius. ⁸⁹¹ It was also desired to learn whether respiration was influenced in foetal life as well as in extra-uterine life by the vagi. According to the experiments of Marckwald, rhythmical respiration is due to reflex action, impressions of irritation being transmitted to the centre and there converted into motor impulses. After the removal of the vagi and the superior cerebral fibres, the rhythm of respiration is lost and spasmodic respiration occurs. Upon newborn animals, Heinrichius found that by separating the upper nerve-tracks from their relations with the respiratory centre a decided influence was produced upon respiration. He concluded that all the nerve-tracks which influence respiration are active from the moment of birth. Bonnaire⁵¹ has suggested the use of oxygen by inhalation for certain morbid conditions in the newborn. He first tried it with a premature infant which had been kept for several days in an incubator without good result. The oxygen was introduced into the incubator, and was supplied for two hours daily. After a week of this treat-

ment, the child was strong enough to be removed from the incubator. The oxygen was again tried with several infants who were suffering with bronzed haematuric disease, being administered in the same manner as in the first-mentioned case. The results were very good. The following are considered suitable indications for the use of oxygen in the newborn: 1. Whenever there is insufficient pulmonary haematoses, either from obstruction of the respiratory passages or from weak action of the mechanical apparatus of respiration, or from want of excitation of the respiratory nerve-centre, oxygen is indicated. Apparent death in the newborn is, therefore, the first indication, though this does not exclude efforts at artificial respiration; besides, oxygen is not always available as soon as required. But if the first dangers of asphyxia have been overcome, and respiration is still defective or pulmonary disease imminent, with general asthenia, oxygen will be found of value. 2. Oxygen is also indicated for disorders in the interstitial circulation, of which sclerema in premature infants is one of the most common manifestations. 3. Changes in the blood, of infectious origin, like that which takes place in the haematuric bronze disease, of which mention was made. 4. Conditions in which there is decided depression of the temperature. Athrepsia, in its acute and chronic forms, is the type of such conditions.

Pneumonia.—Lubarsch²⁰ reports the case of an infant which died on the third day from birth, after having suffered with fetid diarrhoea. A diagnosis of Winckel's disease or of sepsis had been made, though the urine contained neither albumen nor haemoglobin. The autopsy revealed the presence of pleurisy and catarrhal haemorrhagic pneumonia, enlargement of the spleen, and swelling of Peyer's patches. In all the organs and in the vessels was found an abundance of bacilli, especially the bacilli of typhoid fever. In the intestines bacteria were found only in the vessels of the submucous and the muscular coats. The bacterial investigation showed rods of a short, oval form, in groups of two, and with a peculiar movement. They were stained by Löffler's method and decolorized by Gram's or Weigert's method. The bacilli were very virulent in young guinea-pigs and dogs, the results being septicaemia, a haemorrhagic fibrinous inflammation at the seat of the injection, and swelling of the follicular apparatus of the intestines. Pure cultures of the bacilli were obtainable from the exudate. The

bacillus resembled that described by Grtner, and found in infectious enteritis caused by the ingestion of unsuitable food.

The possibility of infection of the foetus is further shown by Vitti,³¹⁷ who observed a case of double lobar pneumonia in a woman in the ninth month of her pregnancy. She died thirty hours after delivery, and the child lived sixty-seven hours. An autopsy upon the child showed pneumonia upon the left side, with fibrinous pleurisy, pericarditis, and peritonitis. Pneumococci were found in the spleen, and in the exudate of the lungs and the serous membranes.

DISEASES OF THE STOMACH.

Of medico-legal interest is the statement of von Maschka,³⁴ that the test known as the stomach-intestine test (inflation of the stomach and intestines to determine whether an infant were or were not still-born) is of no particular value, except as supplementary to the lung-test (ability of the lung to float in water; of course, if it floated, it would indicate that there was air in the lung,—hence, that the child was not still-born). It not infrequently happens that both tests should be used to reach a satisfactory conclusion.

Irrigation of Stomach.—Faucher⁵ proposes to modify Ebstein's operation of irrigation of the stomach by holding the child's head forward to prevent the contents of the stomach from slipping back into the pharynx. The child's arms are to be secured behind with a napkin, the gastric end of the stomach-tube is placed in the child's mouth, and then, as the sucking and swallowing movements are excited, the sound is carried down into the stomach. The irrigation with alkaline-water is then to be proceeded with the same as in adults. A case of obstinate dyspepsia in a very young infant, beginning a few days after birth, and caused by too frequent nursing from the mother's breast, is narrated, including the recital of changed conditions for the better under the irrigation treatment.

Hypertrophy of Pylorus.—A specimen of hypertrophy of the pylorus, from an infant 7 weeks old, was shown by Pitt² to the London Pathological Society. The child was well until it was $3\frac{1}{2}$ weeks old, when it began to suffer with constipation and vomiting. This was relieved for a short time, then returned, and was finally fatal. At the post-mortem examination the stomach was found empty, but its wall was dense and hypertrophied. The duodenum

was bent sharply on the pylorus, the latter being one inch long and five-twelfths inch thick. No adequate explanation was offered for this unusual condition.

DISEASES OF THE INTESTINES.

Porak and Bernheim² report a case of occlusion of the duodenum. The child was born at the eighth month, and from the first day vomited after each attempt at nursing. On the third day, no meconium having been evacuated, a sound was passed into the rectum to the extent of two inches, thus removing the suspicion that the rectum was imperforate. An enema was given, and a small quantity of meconium came away. The vomiting continued, however, and the infant died on the fifth day. The autopsy revealed a dilated stomach, while the lower part of the large intestine was full of meconium. The remainder of the intestinal canal resembled a cluster of worms. The stomach communicated by a contracted pylorus with a blind pouch, which had no connection with the rest of the intestine, and terminated in a blind extremity near the pancreas. There was no evidence of peritonitic bands as the cause of trouble. Such cases are very rare, one being reported by Crooks in 1828, and another by Luton in 1855. Acute intestinal strangulation, due to volvulus, was observed in a newborn infant recently seen by Lucas.² The abdomen was much distended, and a left inguinal colotomy was performed, on the supposition that the rectum was imperforate. The operation resulted fatally, and an autopsy showed the colon, rectum, and lower two feet of the ileum in a normal condition, but the three feet of intestine above the latter were distended and acutely inflamed. There was a sharp line of demarcation from the healthy bowel above. No traces of bands or intussusception were found, and it was supposed that the trouble was due to a volvulus which had become untwisted. This is merely conjecture, however, and may or may not be correct. Cripps²⁰¹⁷ has reported a case of volvulus of the newborn infant, a Littré operation having been performed, and the child dying on the third day. In this case a volvulus of the ileum was found.

Diarrhoea.—Le Sage offers the following classification of certain forms of diarrhoea which appear in the newborn: 1. Those cases with green biliary-acid discharges, without infection, the dis-

charge yielding a rose or violet color with the nitric-acid test. In some cases children will increase in weight notwithstanding the diarrhoea. If there is loss of weight, a claret-glass of Vichy water may be given before each nursing, or a mild purgative every four days. 2. Cases in which there are signs of infection, the stools being pale green and scanty, the temperature as high as 40° C. (104° F.), and the tongue dry. The cause may be an excess of food, or food of bad quality. Treatment should consist in changing the milk and the administration of astringents or purgatives. 3. Cases in which the stools are green, alkaline, and biliary. This form is epidemic and infectious. The temperature in such cases may become quite elevated, the skin is icteric in appearance, and the result may be grave or even fatal. The pathogenesis is obscure.

DISEASES OF THE HEART.

Influence of the Vagi.—Heinricius³⁹¹ has made a series of experiments to determine whether the vagi are in condition to determine an inhibitory effect upon the heart-action immediately or during the first few days after birth. He found that the heart responded to electrical stimulation of the vagi in the newborn in the same manner that it did in adult animals; that is, with unequal sensitiveness. He also found that stimulation of the vagi would inhibit the heart-action of the foetus, even while it was subject to the placental circulation.

Patency of Foramen Ovale.—Haw⁶ describes an interesting case of permanently open foramen ovale. First, there was typical Cheyne-Stokes respiration, but the cyanosis was not always equally pronounced, being scarcely apparent at the beginning of the disturbed respiration, and becoming very marked when the respiration came to a halt. The explanation consisted in the fact that the valve of the foramen ovale was not on the left side where it ordinarily is, but on the right side of the auricular septum. A stream of arterial blood would come, therefore, from the left auricle to the right, and the blood in the lung would not be sufficiently venous to effect the normal type of respiration. Only when through insufficient aeration the blood became venous was there sufficient stimulus to deep respiration.

Hypertrophy.—An unusual condition is congenital hypertrophy of the heart. A case of this character was reported by

Rheiner.²⁰ The child's symptoms were bronchitis, dyspnœa, lividity of the lips, and dullness over the region of the heart. Death came suddenly. At the autopsy enormous hypertrophy of the heart was found, but nothing else. The weight of the heart was 170 grammes ($5\frac{1}{2}$ ounces), which was ten times the normal weight. The left ventricle was a cubic centimetre in thickness, which was double the normal thickness. Remnants of foetal endocarditis were found at the mitral valve, and this may explain the enormous hypertrophy of the left ventricle. No explanation can be given for the thickening of the heart-muscle in general, unless it is accounted for by an idiopathic increase in growth. This seems a very "lame" explanation. Why could not ignorance be confessed, which, in most, if not in all, cases, is synonymous with *idiopathic*?

Congenital Faults.—The following interesting cases of anomalous conditions of the heart at birth have been reported: Cnopf's case³¹ was an atrophic female dying at the third month, four days after an operation for cleft palate. Examination of the heart showed absence of the cone of the pulmonary artery, the vessel springing from the right auricle, from which it was separated by only a thin membranous septum which covered only the two upper thirds of its lumen. The artery had no semi-lunar valves, but spread out abruptly into a pouch-like formation, from which the two chief branches proceeded. Between the ventricular and the auricular septa there was an open fissure, by which the bicuspid and tricuspid valves were united. The left auricle was hypertrophied to the thickness of the left ventricle. The aorta was dilated as far as the origin of its great branches. The valves and endocardium were normal.

Szegö's case,²² in which death came from catarrhal pneumonia, showed a defect in the anterior portion of the ventricular septum, tricuspid insufficiency due to endocarditis of one of its cusps, extensive hypertrophy of the right ventricle, unclosed foramen ovale, and fissure of the auricular septum. The ductus Botalli persisted. Klipstein¹⁵⁸ reports 2 cases. The first was a boy, dying thirty-six hours after birth, having suffered with cyanosis and dyspnœa. The heart was twisted forward upon its root, there was no ventricular septum, and the trabeculae passed transversely across from one chamber to the other. The left ventricle was thickened, the central layers of the heart-wall had undergone

fibrous degeneration, the endocardium of the left ventricle was thickened and its cavity no larger than a cherry-stone, the mitral valve was rudimentary, and there was no root to the aorta at the left ventricle. From the right ventricle sprang a large vessel, and from the arch of the aorta, one centimetre from the insertion of the valve, proceeded the pulmonary artery as large as a quill. The aorta began with the abnormally dilated ductus Botalli.

The second case was a boy, who died quite suddenly on the second day of life. The heart was large, the right ventricle was dilated, and the foramen ovale open. The cavity of the left ventricle was no larger than a cherry-stone; the mitral valve was well formed; the ostium of the aorta was wanting; the ventricle was closed at the location of the aortic valves. The ductus Botalli was opened. The arch of the aorta was only half as large as the pulmonary artery. Beyond the closed ostium of the aorta were the aortic valves, fused together with their noduli Arantii. In front of the aorta were the coronary arteries. The pulmonary artery was a wide tube, which gave off two branches.

Endocarditis.—Porak and Bernheim's case¹⁶⁴ was a male, who seemed normal at birth, but died on the seventh day, after recurrent attacks of cyanosis with dyspnoea. The right side of the heart was normal, excepting that the foramen ovale was patent. The left side was smaller than normal, and within the ventricle were numerous adherent bands. The mitral valve consisted only in some irregular projections, together with a firm diaphragm, with a small central aperture. The aorta was small, and the wall of the left ventricle was thickened. The diseased state of the heart was considered due to foetal endocarditis, and not to faults of development. This condition of endocarditis in the foetus and newborn infant is of rare occurrence. It is prone to result, as in the foregoing case, in destruction of the structure and function of the mitral valve. Duroziez¹⁷ has been able to find but 3 recorded cases of this condition in a period of forty-five years.

DISEASES OF THE LIVER.

Icterus.—Schiff⁸⁴ has contributed yet another article to the subject of icterus, a field in which he has already done good work. His investigations were in harmony with those of Hayem in regarding the number of corpuscles during the first fourteen days

of life as varying between 500,000 and 600,000 per cubic millimetre. An investigation of 700 cases showed that the number of red corpuscles in an individual case was subject to great variations, so that the opinion of Hélot, that increase in the number of these bodies is occasioned by deferred ligation of the umbilical cord, is without foundation. Schiff has studied the blood of several children who became icteric from the moment of birth on, and he could discover no difference in reference to the number of blood-corpuscles in the period before and after the appearance of icterus, or, if any difference, there was diminution in the number after icterus appeared, which supports Ebstein's view that icterus occasions anaemia. The number of white corpuscles is increased only when complications—for example, anaemia—lead to stasis. The haemoglobin in the blood is proportional to the red corpuscles. As to the influence which the blood exercises in causing icterus neonatorum, the question is still an open and, as yet, unexplained one.

Frequent as is icterus neonatorum, there is still a want of harmony among those who write concerning its cause and treatment. A number of interesting contributions to the subject have appeared during the year. Burton-Fanning² reports the case of an infant who was well until 3 days old, and then became jaundiced and began to pass blood with its urine. The discharge of the blood continued the following day. Gray powder was given, and on the sixth day both jaundice and haematuria had disappeared. Haemorrhage is not infrequently associated with icterus in the newborn, but icterus with haematuria is very unusual, and, at present, cannot be explained.

A most peculiar instance of heredity is related by Thomas.⁶⁶⁷ A woman was the mother of five children, and they all died a few days after birth, icterus being the only discoverable disease in all of them. After the death of the last one an autopsy was allowed, and it was found that both ductus communis and the cystic duct were impervious cords. The gall-bladder contained bile, but there was no canal by which it could get out. The conjecture is a reasonable one, that the same condition obtained with each of the other children, as each suffered with fatal jaundice, lasting only a few days.

Cnopsf.⁸⁴ divides icterus, from its pathogenic stand-point, into two forms, acute and chronic, his opinion being based upon

personal observations, as well as those of Silbermann, Naunyn, Minkowsky, and Afanasiew. All these writers concur that the theory of a purely haemogenous origin for acute icterus is not warrantable, and that in all cases the liver must be more or less at fault. New conditions of vitality are created by respiration, changes in the circulation, etc., and these produce decided changes in the condition of the corpuscles, an excess of pigment in the liver, and then biliary stasis and resorption. The researches of Gubler, Troussseau, Schüppel, and Cnops show that chronic icterus is sometimes due to congenital faults in the formation of the bile-ducts (as in the case narrated in the previous paragraph) or to acquired lesions of the hepatic tissue and biliary passages. It may also be due to syphilitic inheritance.

Serous Cysts.—Guéniot³ reports the case of a greatly deformed foetus, whose liver contained two cysts,—one of the right lobe and the other of the left. The cysts contained a clear, yellowish liquid. Their walls resembled the columnæ carneæ of the internal surface of the heart. The father was a victim of chronic alcoholism and absinthism. Rosenberg¹³ offers a new theory for the origin of icterus neonatorum, *apropos* of the investigations of Virchow, Chauffard and Dupré, and Wistinghausen, concerning the intermediary circulation of fat through the liver. Immediately after birth the gall-bladder is free from fat. As soon as food is taken, an abundant secretion of bile is excited. At first there is no obstacle to its resorption, and this occurs the more readily the fewer the drops of fat which pass into the bile and into the epithelium of the gall-bladder. After each nursing the number of fat-drops increases, the bile is more and more rejected by the absorbing surface, until finally the latter is entirely covered with fat-drops and the normal condition is attained.

DISEASES OF THE GENITO-URINARY ORGANS.

Congenital Faults.—A curious instance of mal-development is reported by Marocco,⁷⁰² in the person of a 7-month baby who died five days after birth. The external genitals were absent. A small opening under the pubes gave exit to urine, meconium, and mucus. The ureters proceeded from the kidneys 2 centimetres away from their normal openings in the renal pelves. The intestine terminated in the upper portion of the vagina. There was

pyelo-nephritis, with a large accumulation of pus, in each kidney, this process probably developing during intra-uterine life.

Mandl ^{July 22} reports a case of urethral (female) atresia. Vomiting began sixteen hours after birth, and the child cried unceasingly until spasms ensued. There had been no discharge of urine since birth. A fine sound was passed into the bladder, and the thick urine which it contained was drawn off. Then the vomiting ceased, and the child appeared to be well. Atresia of the urethra in the newborn female is a very rare occurrence. The trouble in this case was probably due to an accumulation of inspissated epithelium. Berti ^{Sept. 25} made observations upon 28 breast-fed infants, none of them children of primiparæ, in order to obtain information concerning the urinary excretion during the first few days of life. He reached the following conclusions: 1. The quantity of urine generally increases during the first six or seven days of life, and then the increase either diminishes or ceases altogether. 2. From the quantity of urine secreted on the first day, conclusions cannot be drawn as to the quantity which will follow. 3. A diminution in quantity accompanies such conditions as immaturity, feebleness, diarrhœa, and thrush. 4. There is no definite relation between the robustness of a newborn infant, as indicated by his weight, and the daily quantity of urine secreted. 5. The quantity of urine passed during the day is greater than at night. This is especially noticeable after the fourth or fifth day of life.

Renal Calculi.—Howard ^{Sept. 7} reports a case, which was assumed to be one of renal calculi, in a newborn infant. No faecal matter was passed until the third day of life, and no urine until the evening of the third day, when a small quantity of dark urine was passed, and also a hard, dark-brown stone as large as a bead. The next day no urine was passed, and none on the following day until the evening, when a small quantity was passed, and with it a quantity of red gravel. Subsequently the urine was passed once each twenty-four hours, and always in connection with the uric acid, until the tenth day, when feeding was commenced with condensed milk from a bottle. This was given with regularity every two hours, the child meanwhile improving in health and strength and the uric-acid discharges ceasing. There was no family history to account for the child's condition. It does not seem clear that

the stone or the uric acid came from the kidneys. Why may it not have been collected in the bladder during foetal life?

Renal Cysts.—Bar and Lamotte³⁶ have reported interesting renal malformations in a newborn infant which lived only three-quarters of an hour. Both kidneys were enlarged, cystic, and cirrhotic. There was no obstruction in the ureters, bladder, or urethra; there was complete anuria, no urine being found in the bladder and none having passed at birth. The abdominal walls were loose and flaccid, and there was no liquor amnii, which may have resulted from the renal changes.

Lacteal Secretion.—Variot² examined a number of infants with reference to the presence of milk in the mammary glands. It was present in considerable quantities, even in cachectic and syphilitic infants. It was obtained from the eighth to the fifteenth day after birth by gently squeezing the gland. After the fifteenth day the quantity diminished greatly, but a serous fluid could be expressed for four or five months. During the period of greatest activity the gland was swollen and tender. It is important to note this condition, as it may lead to abscess, though it is not stated that such a result occurred in any of the cases examined. The secretion was present in male and female infants alike, and had the same microscopical appearance as woman's milk.

DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

Tumors.—A number of interesting cases of tumor of the brain and spinal cord are reported. One is reported by Marano,⁷⁰² in which the tumor was located at the middle of the occipital region. Its circumference was 8 centimetres, and it contained fluid which communicated with the cranial cavity. The tumor was removed at its base, the mass weighing 470 grammes. The child recovered. Oui²³⁹ saw a case of triple cephalhaematoma, biparietal and occipital. Only 3 similar cases were found in the literature of the subject. One of the tumors contained pus, a second blood, and the third was not opened. The child was born after a precipitate labor, falling to the ground and receiving contusions which were followed by the development of the tumors. The child was removed from the hospital when 25 days old, and was not seen subsequently by the reporter. Périer¹⁰⁰ observed a meningoencephalocele at the middle of the occipital region in a newborn

infant which, on the third day, had reached the size of a large orange. On the twenty-eighth day it was excised, and was found to consist of meningeal tissue, a portion of the tela chorioidea of the third ventricle, and portions of cerebrum and cerebellum. The child made a rapid and almost uneventful recovery.

Trismus and Tetanus.—Chapin¹ records a fatal case of trismus, which began on the sixth day, death occurring on the tenth. Autopsy showed that the disease was due to infection through the umbilicus. He quotes the conclusions of Guelpe as to the origin of the disease as follows: 1. Tetanus (trismus) is an infectious disease. 2. Traumatic tetanus, in the true sense of the word, does not exist. 3. Tetanus is not of equine origin, but has a microbial and telluric origin. 4. The symptoms of tetanus are not the direct effect of the microbes, but occur in consequence of the toxic substances generated by them. 5. The multiplication of the microbes at first is limited to the seat of the infection; later, the bacillus may be diffused through the organism. 6. Though the nervous theory of tetanus be opposed, it must be admitted that the nervous system possesses an excessive and altogether peculiar susceptibility to the action of the micro-organisms or the products generated by them. Prophylaxis is more efficient than treatment after the disease has become established, and should consist principally in keeping the umbilicus clean.

Baginsky¹, treated an infant with this disease with injections of blood-serum from an animal who had been rendered immune to the disease. The child died on the sixth day of the disease. No change was found after death in the umbilicus, the peritoneum, or the umbilical vessels. Culture experiments with serum from the diseased umbilicus reproduced the disease in mice. At St. Kilda, in the Scotch Hebrides, this disease may almost be considered endemic.⁶ It is also very common in Iceland. Cold, dampness, and dirt seem to be the predisposing factors to its development.

Waddington⁶¹ has had the unusual experience of treating 2 cases of this disease, with resulting recoveries. He reports 6 other cases which were fatal. In the cases which recovered, the disease was associated with ulceration and sepsis of the umbilicus. The umbilicus was cleansed with peroxide of hydrogen and betanaphthol, iodoform being dusted upon the surface. Internally,

1 grain of beta-naphthol was given every half-hour, and 1 grain of chloral hydrate every hour. Bérényi³⁷⁶ has cured a case of this disease with sulphonal, 3 grains (0.19 gramme) at a time being given by the rectum. In all, 150 grains (10 grammes) of sulphonal were given, the spasms diminishing in severity and frequency as soon as the treatment was commenced. In six days the child was entirely well.

Epileptiform Convulsions.—Luscher¹⁰² has observed a case of epileptiform convulsions in a male infant, beginning at the twenty-first day of life, and continuing at irregular intervals until the child was six weeks old. The father and the paternal grandparents were decidedly neurotic. The treatment, which was believed to have brought relief, consisted in the administration of $2\frac{1}{2}$ grains (0.16 gramme) of sodium bromide every three hours, and 2 grains (0.13 gramme) of potassium iodide three times daily. The spasms, as described, were nearly epileptiform in character, and did not seem to interfere with the well-being of the child. Two similar cases have been reported by Bissel, one beginning at the seventh and the other at the twenty-first day after birth.

Obstetrical Paralyses.—The subject of obstetrical paralyses is an interesting one, and one in which there is room for much divergence of opinion, especially in regard to etiology. The term is strictly applied (Klein¹⁰⁵) by Erb and Duchenne to paralysis of the arm, involving the deltoid, biceps, infra-spinatus, coraco-brachialis, brachialis anticus, and supinator longus, but there are also paralyses of the facial muscles and of the muscles of the lower extremities, all being supposed to be due to difficulties in parturition, and especially in cases in which the obstetric forceps are used. Suckling³² recently showed a well-marked case of Erb and Duchenne's paralysis, the fifth cervical nerve having been injured during the liberation of the shoulder.

Dauchez² has also written interestingly upon the subject. He distinguishes three varieties of this paralysis. The first is called spontaneous, and is due to the natural or abnormal mechanism of labor, and not to the obstetrician. The second is the result of traction, version, or forceps. The third is a pseudo-paralysis, in which there is primary or secondary dislocation of one or both upper extremities. The prognosis in the true paralyses of this character varies from very bad to encouraging. If electricity is

administered, it should be used with the greatest caution and intelligence, or it may make matters worse. Massage and stimulating baths will often be found serviceable.

Syphilitic Pseudo-Paralysis.—Comby¹¹⁸ calls attention to the fact that in syphilitic infants one sometimes sees functional impotence of one or both upper limbs or of all four limbs. In such cases the bones may have hyperostosis, they may break spontaneously, or the epiphysis may be uncovered. The disease was first described by Parrot, who thought it incurable. Other authors, including Comby, have taken a much more favorable view of the matter; in fact, 23 cures have been recorded. The prognosis depends upon the child's surroundings, his general condition, the absence of visceral lesions, and the sagacity of the physician in discovering the disease and acting promptly. If the ordinary signs of congenital syphilis are absent, a diagnosis must be made by careful examination of the pseudo-paralysis, and the exclusion of fever, traumatism, and trophic disorders. The inunction of mercury is considered the best means of treatment, but mercury in other forms may also be administered.

DISEASES OF THE BLOOD AND THE BLOOD-VESSELS.

Visceral Haemorrhages.—Spencer²¹² gives the following conclusions concerning haemorrhages into the viscera of the newborn, as the results of 130 autopsies: 1. In children who were still-born, or who died soon after birth, congestion or œdema and haemorrhage were found in various viscera. 2. These haemorrhages occurred, both in easy and difficult labors, with and without interference on the part of the *accoucheur*, in cases in which the mothers were deformed, and in others in which they were not. 3. They were most frequent and most profuse in cases in which the children were subject to much pressure. 4. Cerebral haemorrhage occurred most frequently in still-born children who were delivered with forceps, and in breech cases more frequently than in those in which there was natural delivery by the head. 5. Haemorrhage into the other viscera occurred more frequently in pelvic than in cephalic presentations. 6. The haemorrhages and the accompanying injuries were in many cases the cause of still-birth. 7. Such results were most likely to be avoided by preventing premature rupture of the membranes, by artificial dilatation of the par-

turient canal, by restricting version and other artificial manipulations to urgent cases, and by preferring cephalic to podalic version. 8. The forceps should be limited to cases in which there is absolute danger to mother or child, if they are not used. 9. In breech presentations examination of the genital organs of the child should be avoided during labor. The child's limbs should be wrapped in antiseptic wool as soon as born, and traction should never be made with the hand around the child's waist. 10. The sterno-mastoid muscles should not be unduly pressed or stretched in delivering the after-coming head, and the head should then be delivered with forceps when the head is in the pelvis, if nature does not promptly effect the delivery. The subject of hæmorrhages in the newborn is thus summed up by Townsend⁹⁹: 1. Hæmorrhage in the newborn is in nearly all cases an acute transitory affection, beginning within the first week or ten days of life, and lasting from one to six days. 2. The etiology of this condition is perhaps best explained by the theory of infection. 3. In very exceptional cases, the condition is due to true hæmophilia as occurs in older children and adults. In a small number of cases it is one of the symptoms of syphilis or septicæmia. 4. The mortality from all varieties is about 75 per cent. 5. Treatment should be influenced by the fact of the transitory and perhaps infectious character of the condition as it is seen in the majority of cases.

Hæmorrhagic Diathesis.—Neumann¹⁵⁸ narrates 2 cases of fatal hæmorrhage in the newborn. In one the presence of the bacillus pyocyanus and staphylococcus may have had something to do with the hæmorrhage. The mother of the child was syphilitic. In the second case there was hæmorrhage from an eroded vessel in the stomach. Rigge² reports a fatal case, in which the hæmorrhage was into the intestines. Gray⁷ and Newell²⁰² each report a case, in the first of which recovery eventually resulted, showing that melæna is not necessarily fatal in the newborn. The cause of this condition is variously considered by systematic writers as gastric digestion from an obstructed portal system, gastric or duodenal ulcer, insufficient respiration with atelectasis pulmonum, too early ligature of the funis, etc.

Hæmorrhage from Genitals.—Eröss¹⁵⁸ has observed that our knowledge concerning hæmorrhage from the genitals of the newborn female is quite defective. It may be connected with prema-

ture catamenial discharge, with septicæmia, syphilis, Winckel's disease, acute fatty degeneration, hæmophilia. Eröss has seen 6 cases of this variety of hæmorrhage in the past two years, 1 of which was fatal, after four days of bleeding. Coury⁶ has seen 3 cases similar to those which were just mentioned, and believes they are not very rare. None of his cases were fatal. Two cases have also occurred in the past two years in the practice of McArdle.⁹ In each case the hæmorrhage began on the fifth day and lasted four days.

Meningeal Hæmorrhage.—Richardière¹ concludes, in regard to meningeal hæmorrhage, as follows: 1. Meningeal hæmorrhage constitutes one of the most frequent causes of death in the newborn. 2. It occurs at the very moment of birth. 3. It differs from the majority of meningeal hæmorrhages in the adult by the absence of previous inflammation of the arachnoid or the dura mater. 4. It is accompanied in two-thirds of the cases by subpleural ecchymoses. 5. Death occurs usually very quickly. 6. The cause of the hæmorrhage is the traumatism of the delivery as the head is passing through the pelvis. 7. Meningeal hæmorrhage, from a medico-legal stand-point, excludes all idea of criminal intervention.

To the foregoing may be added the statements of Kundrat.³¹⁹ One form of hæmorrhage which he mentions is upon the convexity between the arachnoid and the pia, and this is sometimes bilateral. Another form is a combination of this condition with hæmorrhage between the arachnoid and the dura. The latter produces serious results, including brain-compression, and sometimes asymmetry of the cranium. The lungs of children who are born after such an accident are usually collapsed, but there are no ecchymoses on the pleura, and the children sometimes live. In some of these cases the parietes of the cranium have been displaced, causing compression of the longitudinal sinus, with regurgitation of the blood through the veins of the convexity, and consequent rupture. Concerning the results of meningeal and cerebral hæmorrhage, they depend both upon the extent of the bleeding and the resisting-powers of the child. Kreyberg¹⁵⁸ reports 4 cases in which apoplexy occurred at birth. In the first the child lived four days, and on the last day the left half of his body was paralyzed. The second was paralyzed in the left lower extremity, suffered with convulsions, and at 3 years of age was deficient in intelligence. The third had spasms immediately after birth, but at 4 years of

age was apparently in good health. The fourth had spasms immediately after birth, and they recurred occasionally during the first half-year. At 4 years of age she was apparently well.

SURGERY.

Diaphragmatic Hernia.—This is a rarer and far more fatal accident than umbilical hernia in the newborn. It would be interesting to know how many cases of the latter have been operated upon, but have not been reported in consequence of the complications connected with them. Certainly, in my judgment at least, a case of this kind should not be operated upon except under the most pressing indications; and then the prospects for recovery are least encouraging. Gauthier,² reports a case of diaphragmatic hernia in which the infant lived but one hour. The left half of the diaphragm was deficient. The left lung was unexpanded, undeveloped, and no larger than a bean. Most of the small intestine, the stomach, spleen, and pancreas, lay in the left half of the thoracic cavity. The heart and pericardium were pushed to the right, with the thymus, and had prevented thorough expansion of the right lung. Madame Henry, head midwife to the Paris Maternity, has had the unusual experience of seeing 5 cases of diaphragmatic hernia.

Fractures.—A case is reported,³⁵⁶ in which the left humerus of an infant was fractured during the delivery of the shoulders. The



FRACTURE OF FEMUR DURING DELIVERY. (WYETH.)
(*New York Medical Journal.*)

fracture healed entirely in ten days. Wyeth¹ reports a case in which the femur of a female infant was fractured at the trochanter during delivery, the presentation being a breech one, and traction being used with the index and middle fingers of each hand in the flexures of the thighs to facilitate delivery. The trunk and affected lower extremity of the child were encased in plaster, and in three weeks complete union had resulted.

DIETETICS OF INFANCY AND CHILDHOOD.

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LACTATION.

Monti¹⁵⁸ draws the following conclusions from analyses made of human milk: 1. Every specimen of human milk which has a specific gravity of 1030 to 1035 and also from 3 to 5 per cent. of fat elements, in which, also, the specific gravity increases in the same proportion in which the fat elements increase, if both exceed the limits stated. and every specimen which also shows little variation in these elements during the nursing period, may be considered good and useful for the child who is to receive it for food. 2. Menstruation exercises no constant influence upon the specific gravity and the fatty elements of milk. In some of the cases which were investigated by the author, however, there was an increase in the quantity of fat, which disappeared with the disappearance of menstruation. 3. In those cases in which the mother's milk reached a high specific gravity during the period of lactation, and the fatty elements were in relatively small quantity, reckoning upon the standard which has been mentioned, the children did not thrive. Such a quality of milk must, therefore, be considered as not useful for a nursing infant. 4. The excessive quantity of fatty constituents in human milk can be caused very readily by pathological processes,—as by mastitis, or by any other extensive febrile process from which the mother may be suffering. 5. Also, as a consequence of pathological processes of long duration, a rapid or gradual diminution in the quantity of fat in the milk is sometimes observed.

Schlichter¹⁵⁹ shows us that, until very recently, there have been two entirely different views in regard to the influence of

menstruation upon lactation. Heretofore it has been necessary to weigh the child and obtain an accurate account of its general condition and the condition of its stools before and after the menstrual period of the one who nursed it, and also to make an analysis of the milk during and after menstruation. Variations in the composition of the milk must also be noted each day. During and after menstruation the author found these variations to be as follow:—

In casein there was an average difference of $\frac{5}{100}$ per cent. in favor of the milk secreted during menstruation and in fat $\frac{34}{100}$ per cent.

In albumen the average difference was $\frac{3}{100}$ per cent. against the milk of the menstrual period, in sugar $\frac{9}{100}$ per cent., and in dry substances $\frac{12}{100}$. These differences, however, are not so great as sometimes occur in a single day when menstruation is not present; hence the differences during that period ought not to work any particular harm.

Davis, of Chicago, has stated that animal germs were discoverable in the milk of pregnant women and to a lesser degree in that of menstruating women, which might cause disease in children; but the bacteriological investigations of Schlichter show that the milk under both conditions was sterile. The author comes to the following conclusions: (1) should menstruation occur within the sixth week after pregnancy it would have no harmful influence upon the child; (2) should menstruation occur before the sixth week, it could have no possible deleterious influence upon the development of the child; (3) dyspepsia, intestinal catarrh, colic, etc., sometimes occur in a child during the menstrual period of the one who is nursing it, and should be treated in the same way as if they occurred at any other period, and not by a change of nurse.

Schling¹⁵⁴ has made a series of investigations upon the influence of drugs administered to nursing mothers, with the following results:—

Sodium Salicylate.—Dose, 15 to 30 grains (1.94 grammes). When the child was not put to the breast for an hour or more after the administration of the drug to the mother it was always found in the infant's urine, and disappeared in twenty-four hours. If the infant nursed very soon after administration, there was no trace of the drug in its urine.

Potassium Iodide.—Similar results. Analysis of the milk gave the characteristic reaction. Elimination in the infant lasted seventy-two hours; in the mother, forty-four hours. After twenty-four hours the milk contained the drug.

Potassium Ferrocyanide.—Reaction very plain in the mother's urine; none in the infant's.

Iodoform.—Employed as applications to the vagina and vulva. After a rather prolonged use, as a rule, iodine was found in the milk and the mother's urine, but never in the urine of the infant.

Mercury.—Its transmission through the milk was always very feeble and irregular, and depended upon the quantity of milk absorbed.

Tincture of Opium.—In doses of 20 to 30 drops, Thornhill has observed, in the infant, prolonged sleep. Fehling has noted neither prolongation of sleep nor constipation.

Morphine Hydrochlorate.—Solution, 1 to 30; doses, $\frac{1}{6}$ to $\frac{1}{3}$ grain (0.011 to 0.022 grammes). No ill effects upon the child.

Chloral.—Dose, 15 to 45 grains (0.97 to 2.93 grammes). Mean duration of maternal sleep, two hours. No action was noted upon strong and vigorous infants. When the child is feeble or premature there should always be an interval of at least two hours between the administration of the drug to the mother and nursing.

Atropine Sulphate.—Solution, 1 to 100. Subcutaneous injections, $\frac{1}{200}$ to $\frac{1}{10}$ grain (0.00032 to 0.00054 grammes). Pronounced symptoms were observed in the mother. Dilatation of the pupils was noted in the infant, which disappeared after twenty-four hours. The drug should not be given to nursing mothers except in very small doses.

Influence of Maternal Fever.—In an immense majority of cases the milk has no ill effects upon the child. When the mother was the subject of a grave disease, with a persistent temperature of 104° F. (40° C.), the fever-curve of the infant presented the same characters as that of the mother. In a case of mastitis, Bumm has demonstrated the presence of micrococci in the milk and gastro-intestinal disturbance in the child.

STERILIZED MILK.

It has been a well-known fact for the past two years that the sterilization of milk has been a necessity, especially during the

summer months, for the little ones who are unfortunately deprived of their mothers' milk; but the milk, after sterilization, has been found to be so changed in that process that of late a reaction has set in, and the question has arisen whether or not the desired immunity could not be better attained by some other means. A. R. Leeds and E. P. Davis contribute a valuable paper as to the nature of the changes effected in milk by sterilization and the clinical value of sterilized milk. Leeds finds that raising the temperature to the boiling-point, and, still more, the retaining of it at that point for a lengthened period, as in sterilization, converts a considerable portion of the soluble into insoluble proteids. The effect of heat is greatest on the galactozyme,—the ferment found in raw milk, which has the power of liquefying starch; even raising milk for a moment to the boiling-point destroys this ferment action. Experiments made to contrast the behavior of sterilized milk with raw milk, when subjected to the action of rennet, acid, artificial gastric juice, and pancreatic juice, show that the casein, while not coagulated by the heat, is, nevertheless, less readily coagulated by rennet, and yields slowly to the action of pepsin and pancreatin. Moreover, a part of the lactalbumen of the milk is coagulated, although only partially so. Its effect, however, is to thicken the milk and intensify its colloidal (ropy or mucilaginous) character. The fat-globules are, likewise, somewhat affected by the heat, and the coagulated proteid matters attach themselves to the fat-globules, and probably have an influence in bringing about the difficulty with which the fat is assimilated. Finally, milk-sugar, Leeds finds, is completely destroyed by long-continued heating, and is probably affected to a certain extent during the interval ordinarily allowed for sterilization. He thus shows that sterilized milk is less readily and less perfectly digestible than raw milk; and if sterile milk is sought for, the present desideratum is to obtain it either directly from the animal or by a process not accompanied by such serious drawbacks.

Davis confirms the opinion, which has gradually gained ground, that, while sterilized milk may be useful as a remedy in various bowel troubles, it is not sufficient to sustain life. If sterilized milk is indicated, Leeds recommends that, after being rendered feebly alkaline with lime-water, the milk should be heated to 155° F. (68.4° C.) for six minutes; or, still better, the treat-

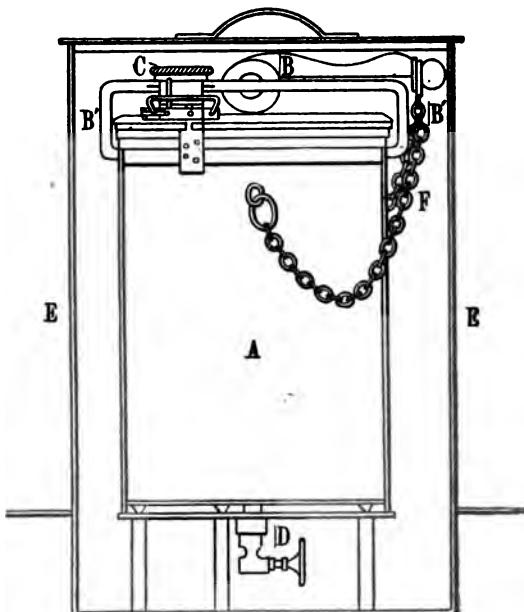
ment, in alkaline solution, with pancreatin at 155° F. (68.4° C.), followed, if not immediately used, by momentary heating to the boiling-point. Either of these procedures, Leeds maintains, will render milk sterile without detracting from its digestibility.

Henry Koplik¹ distributed 7000 bottles of sterilized milk to dispensary patients, some of whom paid the sum of ten cents for 7 bottles (one day's feeding), each containing 3 ounces, whilst others received it gratis. The mothers received the milk for periods ranging from a few days to weeks, or the entire summer months. The ages of the patients varied from 7 weeks to 13 months. When the little patients were improved or cured, the parents were either instructed how to prepare the milk, were told to buy an apparatus, or were furnished with an apparatus for preparing the milk. Most of the writer's patients suffering from the disorders of the digestive tract were breast-fed, consequently were easily cured. The bottle-fed infants alone received the milk. The majority of the cases were acute gastro-enteritis, chronic enterocolitis, acute intestinal dyspepsia, and cholera infantum. In each case, and especially of the last-named disease, all food was either stopped or limited until the severe symptoms had been tided over. Stomach-washing and medicaments, or starving (giving the stomach rest), were actively used. In cases of acute dyspepsia accompanying typhoid fever and pneumonia, where no food could be retained (even, for some reason, the breast-milk of the mother), the sterilized milk was used with brilliant results. One hundred and thirty-four cases were thus carefully observed, and the following sums up Koplik's experience: 1. The most satisfactory are the acute cases. In chronic cases the patients may improve and some may continue to run down hill. 2. Chronic enterocolitis, combined with atrophy, below the age of 6 months, was pre-eminently unsatisfactory. The severe symptoms (diarrhoea and vomiting) ceased, but the patients did not increase in weight or improve, and finally died. 3. Patients with chronic enterocolitis above this period, even with a certain amount of atrophy, held their own, and to-day are living with no trouble and increased in weight. 4. Acute dyspepsias accompanying acute infectious disease were very satisfactory. In 1 case the little patient, suffering from pneumonia, was saved by this food alone; incessant and exhausting vomiting set in as soon as other food (ordinarily prepared milk, breast-milk,

artificial food) was tried. 5. The first symptom to improve and abate was the vomiting, and this generally within the first twenty-four hours. This makes the writer conclude (empirically) that this steamed or sterilized milk is increased in its digestibility over other foods in some unexplained way. 6. In chronic enterocolitis, combined with vomiting (dilatation of the stomach), the vomiting improved only gradually, as did also the diarrhoea. This should be borne in mind. 7. In some cases inordinate constipation replaces the diarrhoea, and needs treatment. 8. Some cases, in which the movements had a very offensive odor with other foods, improved in this respect with sterilized milk. 9. As already hinted, cases of chronic duration, in which the stomach was apparently dilated, had to be treated with stomach-washings at intervals, even during the administration of sterilized milk. 10. In acute cases or chronic cases with vomiting and diarrhoea, in which the patients had been trying all varieties of food, a single preliminary stomach-washing, followed by rest for from six or eight to twelve hours, or even twenty-four hours, during which nothing but albumen-water was used, gave brilliant results. 11. In some cases, either acute or chronic, the patients did not improve with sterilized milk; they became worse, and the mothers disappeared from observation discouraged. 12. Impress the patients that the milk is steamed and not boiled, and this aids in its administration and gains success where this would otherwise be impossible. There are minds which cannot see why, when milk is boiled on the stove, it is not as good as the Soxhlet plan. 13. Experience is in favor of first sterilizing the milk and diluting it *only* when just ready for use. 14. As diluents, barley-water or lime-water, or in some cases an artificial food, seems to do well. 15. Sterilizing skimmed milk, and that prepared by formulæ, which direct to skim it and then add cream, has not been a success in the writer's hands. 16. In cases where the mother is able to nurse the infant at the breast only a part of the day sterile milk is an invaluable adjunct, in that it enables one to observe exactitude and cleanliness in the giving of the auxiliary food much more than has hitherto been possible. 17. The day may never come when sterilized milk will be sold in separate nursing-bottles, at stores within the reach of all, for the simple reason of cost; future labors must lie in the furnishing of dairies with apparatus for sterilizing milk on the spot, and thus prevent-

ing decomposition in transportation. Such milk, on reaching the city, could be sold at depots all over the city (controlled by those interested in the welfare, rather than the monetary circumstances, of the poor). Such milk might be taken away in suitable cans by the purchaser, and thus the elements of adulteration at least be eliminated. 18. Even under the above-mentioned conditions very warm weather might require the possession of a small, suitable home apparatus. For the very poor, the ordinary potato-steamer supplied with nursing-bottles is sufficient. But the market is supplied with several cheap apparatuses; the simplest and best by far is the wire basket, with 8 medium-sized Soxhlet bottles and ordinary rubber corks; this, combined with the large-sized kitchen-pot, makes an excellent apparatus.

Henry Ashby,⁶ describes the new sterilizer devised by Escherich, of Gratz. This apparatus consists of a cylindrical tin vessel, A, of some three pints and a half ($1\frac{3}{4}$ litres) capacity. It has a removable lid at the top, which can be fastened on, hermetically sealing the tin by means of a lever and catch arrangement, B B'. When the lever, B, is raised the lid can be removed; when forced down, as in the engraving, the lid is secured. Fixed in the lid is a wool-filter arrangement, C; the passage through the filter can be opened or shut by means of a stop-cock worked by a stirrup or loop of wire. At the bottom of the tin is a stop-cock for drawing off the milk. The tin fits into an outer vessel, E, which contains water and is placed on the kitchen-range. To use the apparatus, the infant's



ESCHERICH'S MILK STERILIZER.
A, tin containing milk; B, lever; B'B', catch for securing lid; C, wool-filter; E, outer tin vessel containing water; F, chain for hanging up milk-tin.

(*London Lancet.*)

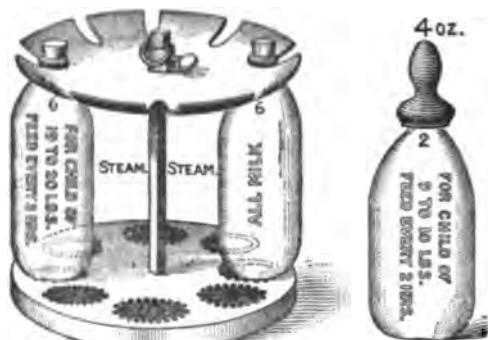
daily ration is prepared, or two days' rations may be taken. In the latter case two pints (1 litre) of fresh milk and one pint of barley-water and sugar are placed in the inner tin and the lid applied, the stop-cocks, both at the bottom and in the lid, being turned off. The milk-tin is placed in the outer vessel containing water, the outer lid closed, and placed on the kitchen-range, and the water is kept boiling for half an hour. The temperature of the milk is in this way maintained at 210° F. (98.9° C.),—a temperature not high enough to risk an explosion, but sufficient to destroy the microbes in the milk; at least, as far as all practical purposes are concerned. No marked change takes place in the taste of the milk. The apparatus is allowed to cool, the inner tin is hung up to the wall of the pantry or other cool place by means of the chain, F, and

the infant's food is drawn off through the stop-cock as required; at the same time the stop-cock in the lid is turned on, and, as the air enters, it is filtered through the plug of wool present in the filter. The food is, of course, warmed up before giving to the infant.

The feeding-bottle suggested by Escherich resem-

bles in size and shape an ordinary 8-ounce medicine bottle; it is graduated, and instructions concerning the amount and strength of the food to be prepared, and the amount to be given in each bottle, are engraved on the side. The maker is Theodor Timpe, of Magdeburg, North Germany. The price in Germany is 12s. 6d.

Another simple form of milk sterilizer is one devised by A. Seibert, of New York. It consists of a tray (see figure) and 8 feeding-bottles, with special rubber stoppers and a nipple to fit onto the bottle when the infant is fed. There are six series of bottles, the smallest size being 3-ounce (90 grammes) capacity and the largest 8-ounce (240 grammes), arranged for infants according to their weights. The bottles are filled up to a given mark with milk, and then up to the neck with barley-water or water, and



SEIBERT'S MILK STERILIZER.
(*London Lancet.*)

sugar added. They are then fitted into the tray, and steamed for half an hour in a saucepan provided with a lid. During the steaming process the rubber stopper is fitted loosely into the bottles, so that the steam escapes by two slots or grooves in the side of the stopper; when steaming is complete the stoppers are pressed into the bottles, so as to seal them up. When the infant is fed, a bottle is warmed up and the stopper withdrawn, and the nipple placed on the bottle.

Theodore Escherich²⁰⁰⁰ read a paper before the International Medical Congress, at Berlin, upon the use of sterilized milk for infants, and laid stress upon the following points: 1. The difficulties and the unfavorable results in the artificial nourishment of children which existed until the subject was studied from a scientific stand-point. These difficulties result from the fermentation processes which take place in milk, especially during the summer months. 2. These fermentation processes are arrested and prevented by the use of an apparatus for rendering the milk sterile. 3. Closely connected with the question of sterilization is that of graduating the amount and frequency of the meals. The amount of fluid should correspond with the capacity of the child's stomach, varying with its age and weight. 4. The proportions of water to be added to the milk is also to be varied with the age of the child.

The following table covers these important points in detail:—

Month.	Week.	Amount of Milk.	Amount of Water.	Total.	No. of Meals.	Amount at Each Meal.	Weight of Child.	Gain.
I	1	150	+250	= 400	: 8	= 50		-220
	1	200	+200	= 400	: 8	= 50	3275	+ 0
	2	250	+250	= 500	: 8	= 62	3376	+ 102
	3	300	+200	= 500	: 8	= 62	3477	+ 101
	4	350	+250	= 600	: 8	= 75	3579	+ 102
II	5-6	400	+400	= 800	: 7	= 115	3942	
	7-8	450	+450	= 900	: 7	= 128	4306	per week + 182
III	9-10	500	+400	= 900	: 7	= 128	4614	
	11-12	550	+450	= 1000	: 7	= 143	4921	" " + 154
IV	13-14	600	+400	= 1000	: 7	= 143	5259	
	15-16	650	+350	= 1000	: 7	= 143	5576	" " + 164
V	17-18	700	+300	= 1000	: 6	= 166	5848	
	19-20	750	+250	= 1000	: 6	= 166	6119	" " + 136
VI	21-24	800	+200	= 1000	: 6	= 166	6679	" " + 140
	25-28	900	+100	= 1000	: 6	= 166	7234	" " + 139
VII	29-32	1000		= 1000	: 6	= 166	7669	" " + 108
	33-36	1200		= 1200	: 6	= 200	8089	" " + 105
X	37-40	1200	+ other food	= 1200	: 6	= 200	8391	" " + 76
XI	41-44	1200	+ " "	= 1200	: 6	= 200	8602	" " + 73
XII	45-48	1200	+ " "	= 1200	: 6	= 200	8893	" " + 58

These are the average figures, from which there may be slight departures, and yet children thrive best when they are most closely approximated. During the first month it is well to add about 4 grains (0.26 gramme) of sugar to each 100 cubic centimetres ($3\frac{1}{2}$ ounces) of milk, or, still better, a teaspoonful of malt-extract. After the tenth month, and in many cases after the sixth, some artificial food, vegetable in character, may with advantage be allowed. At the age of 1 year the diet may be still further varied by giving broths, eggs lightly boiled, with stale bread-crumbs, etc.

Walter Mendelson, ¹ in a paper read before the New York Academy of Medicine, said that much of the confusion and dissatisfaction of the laity in preparing sterilized milk was due to the fact that the theoretical principles upon which they must work had never been simply and fully explained to them. He thought that it was not only the physician's duty to let the one upon whom the preparation devolved know the means, but the object as well. Explain to her or him that investigation had shown that not only were the curdling, souring, and other obvious changes due to the growth of bacteria or minute germs in the milk, but also that various dyspeptic and diarrhoeal diseases of bottle-fed children were caused by the presence in the milk of similar minute organisms which might produce no change in the milk itself. Tell them that it had been found that, when milk had been heated to the boiling-point and kept there for some time, both the plants and their seeds were killed, and the milk was thus rendered fit for food. After having explained that the object was to prepare a food free from germs, the next thing was to show how to accomplish this. The milk, or suitable mixture of milk, water, cream, and sugar, should be prepared as early in the morning as possible, before the heat of the day has caused the bacteria to multiply. Great care must be taken in cleansing the bottles and nipples, and for this purpose "pearline" seemed to answer the best, using it with hot-water and a bottle-brush. The same bottle should never be used the second time without washing. With regard to stoppers, the best consisted of a plug made of ordinary cotton batting, folded into a pretty firm wad, and pushed down for half an inch or more into the neck of the bottle. The nipple should be a plain, conical, pure gum one, with no constrictions in it, so that it could readily be turned inside out for cleansing. When not in use it should be

scrubbed clean and placed in a glass of water, to which a tea-spoonful of borax had been added. As for the sterilizer, any apparatus would do that would answer the purpose of keeping the milk for about an hour at the temperature of boiling. But, of the specially-devised affairs for this purpose, "Arnold's steam sterilizer" was the most ingenious and at the same time simple. The sterilizing of milk had marked a great advance in our methods of infant feeding, and, as the triumphs of medicine in the future would seem to lie in the direction of preventing illness rather than of curing it, it should be the pride and interest of every physician to popularize the method under discussion, for it had already done much to lessen the morbility and mortality among infants.

Scorbutus Supposed to be Caused by the Use of Artificial Baby-Foods.—G. H. Whitcomb⁵¹ reports the following interesting case of scorbutus, evidently caused by the use of artificial baby-foods: C. W. la V., aged 11 months, third and healthy child of sound and mature parents, whose family history is unexceptionable. Their house is in one of the most salubrious portions of New York City. The sanitary and hygienic conditions are all that ample means can secure. The child nursed in part, and had its scant food-supply pieced out by one of the artificially manufactured baby-foods for five months, when an attack of tonsillitis dried up the maternal milk, after which the artificial food became the exclusive diet, by the explicit direction of the family physician. To make sure that the food was in good condition, it was obtained direct from the manufacturer. On this the child seemed to thrive well,—at least, so far as fat was concerned. When a little over 10 months old she became petulant and evinced a disinclination to move or be handled. The legs were partially flexed and maintained rigidly; any attempt to straighten them elicited screams. The gums were spongy and bled frequently; muscular pains were so severe as to deprive the child of rest. The attending physician had diagnosticated and treated rheumatism, meeting the mother's instinctive suggestion of change of food with emphatic disapproval. After ten days the family went to Rome, N. Y., where the diagnosis of rheumatism was approved and the alkaline treatment pursued for two weeks, after which they came to Greenwich. The doctor's note to the writer mentioned the treatment given and suggested a gradual change of diet. The

condition had grown constantly worse for the twenty-four days of illness.

She came under the author's care June 20, 1890, when he found it difficult to make a satisfactory examination, as she screamed wildly when handled by any one.

The child presented a grotesque appearance, owing to the great accumulation of puffy fat. The limbs resembled bologna-sausages,—the natural fold constricting the limbs. The skin was pale and covered with a coarse, papular eruption, interspersed with a few patches of purpura. The appetite and digestion were good; bowels constipated, with dry, lumpy, and often very offensive stools. The urine was of good color and quantity, of alkaline reaction, and loaded with phosphates. The gums were spongy, ecchymotic, and bulbous, the blebs discharging a sero-sanguinolent fluid, producing a faecal breath. Seven teeth had been erupted. No evidence of rachitis was to be found in bone or cartilage. The little patient was free from fever; had fitful and restless sleep; made no voluntary movements; cried out if touched. The pain and tenderness were general, though the lower extremities suffered most, and the left side worse than the right. The hamstring and Achilles tendons were hyperæsthetic, and seemed shortened, as by tonic spasm of their muscles. The diagnosis of infantile scorbutus was too clear to be mistaken.

The treatment was simple and prompt in its results, three weeks sufficing for a complete restoration to health. It consisted of the continuance of the previous good care; out-of-door life; good, fresh milk of native cows, properly prepared; the juice of rare, broiled beefsteak, and sweet oranges. The tincture of the chloride of iron was given for a few days, and constituted the only medication.

The Fermentations of Milk and Their Prevention.—In a lecture, delivered before the Connecticut State Board of Agriculture by H. W. Conn,²⁰¹⁹ on the fermentations of milk and their prevention, the conclusions reached were as follow: 1. The fermentations of milk are varied, although only a few are commonly recognized, because the souring of milk usually obscures all other fermentations. 2. All of the fermentations, except that of rennet, are caused by micro-organisms getting into the milk after milking and growing there. 3. The micro-organisms are so abundant

around the barn and dairy that they cannot be kept out of the milk by any degree of care. 4. The bacteria which produce the abnormal or unusual fermentations, like slimy milk, bitter milk, etc., are, however, not so common but that they may be prevented from entering the milk in sufficient quantities to produce serious trouble. 5. Filth is ordinarily their source, and cleanliness the means of avoiding them. 6. The souring of milk cannot be prevented, even by the greatest cleanliness. 7. Salicylic acid, in proportions of 1 to 1000, may be of some little value in delaying the souring, but its use is not to be recommended except in special cases. 8. Milk can be entirely deprived of bacteria by the exposure to a temperature of from 15° to 20° F. (8.3° to 11.1° C.) above that of boiling water, or by a long-continued boiling, or by a series of short boilings on successive days. 9. Such milk has the taste of boiled milk. This taste appears at about the temperature of 160° F. (71.1° C.); hence has arisen the method of Pasteurization of milk. By this method it is heated to a temperature of 155° F. (68.4° C.) for a short time, and then cooled. This greatly delays the fermentations, and also kills the pathogenic germs that may be present. 10. In our large cities the popularity of sterilized milk is rapidly increasing, especially given to patients troubled with diseases of the digestive organs. 11. The cooling of milk immediately after it is drawn from the cow is of the greatest assistance in delaying the fermentation, and in the present state of our knowledge is, probably, the most practical method which can be recommended.

GASTRIC DIGESTION.

Troitzky, ³⁸⁶ in a valuable paper on gastric digestion in small children, comes to the following conclusions: 1. The presence of completely coagulated casein in the stomach does not warrant one in speaking of the excessively acid contents of the stomach, for a precipitation of the casein from the solution can only happen in consequence of the influence of *lactoferment*, and this acts in the presence of an alkaline reaction. 2. The change of the casein, which has begun to coagulate, to the state of solution with subsequent peptonization, is due to the simultaneous action of acid and pepsin, and the stomach takes up the albumen the more successfully and completely the more the quantity and composition of the digestive secretions approach the normal. 3. Lactic acid must be

regarded as a normal constituent of the gastric juice; at least, in very young children and in those with whom the diet is exclusively one of milk. Its formation is encouraged by the milk-sugar which is abundant in the milk. This constant presence of lactic acid has its effect alike upon the digestive process and upon the action of microbes. 4. Hydrochloric acid plays the principal part in digestion, but its determination is not always easy, because the casein of the milk has the property of holding it. Until digestion begins, hydrochloric acid may usually be found in small quantities in the stomachs of very small children. As digestion increases in activity the quantity of hydrochloric acid will also increase. 5. The quantity of acid in the gastric juice of children is relatively very much smaller than in adults, and is conversely as the quantity of food taken into the stomach. 6. The average time during which food stays in the stomach of small children is two hours. 7. Slight mechanical, thermic, or chemical irritation of the gastric mucous membrane will increase the acidity of the secreted juice and favor a rapid emptying of the stomach. Alcohol stays digestion, but counteracts fermentation. 8. The part in digestion which is played by the stomach of the child is an important one, even though it does not appropriate all the albumen which comes into it. 9. The antimicrobial properties of the gastric juice are undoubtedly, and are due to the presence of free acid, especially hydrochloric acid. In consequence of the slight acidity of the gastric juice in the stomach of children, it cannot act as forcibly to retard fermentation as the same secretion in the adult. 10. It has not yet been determined what significance certain micro-organisms have upon digestion. 11. Functional disturbances in the stomach of children are due to changes in the quality and quantity of the gastric juice, the regular exchange in its ingredients being disturbed, or the parts being subjected to physical or chemical changes which are not yet understood. 12. The quantity of gastric juice in the stomach of children may be lessened without necessarily causing an increase of lactic acid, or the appearance of acetic or butyric acids. 13. When the normal secretion of the stomach is deficient, acids are developed which are not suitable for normal digestion. 14. The presence of too much mucus in the stomach may paralyze the digestive activity of the gastric juice, though the latter may be normal as to quantity and as to composition. 15. If too much

food enters the stomach, or if it remains there too long, an insufficient quantity of gastric juice will be secreted for its digestion. 16. The majority of gastric dyspepsias in children are caused by the deficiency of hydrochloric acid in the gastric juice. Functional disturbance is rarely caused by excessive secretion of gastric juice. 17. Diseases of the stomach with definite anatomical peculiarities manifest themselves by the presence of an abundance of mucus, serum, and inflammatory elements. The severer the disease and the longer it lasts, the more conspicuous will be these elements. 18. With inflammation of the gastric mucous membrane digestion is reduced to a minimum, even though the gastric juice remains normal in quantity and quality. 19. Disturbed digestion is accompanied by the appearance of an increased number of fermentation phenomena, with the formation of acids foreign to the stomach and its work, as well as by the breaking up of albumen and the formation of decomposition products. The substances which are submitted to fermentation are the fats and the excess of mucus, which ordinarily do not undergo such changes. 20. A diminution or failure in the presence of hydrochloric acid in the stomach signifies the formation of pathogenic elements in the soil favorable to such development, the antimicrobic power of a sufficient quantity of hydrochloric acid being wanting. 21. It is quite possible that certain forms of micro-organisms, or their products, are responsible for the different diseases in the stomachs of children. The means for treating the abnormal conditions of the stomach, which has been found extremely efficient in numberless cases, is irrigation.

Heubner³⁰⁶ gives the following analysis of the acids of the gastric juice during digestion in infants: The children who were the subjects of the investigation were nursed at the breast, or with cows' milk, or with milk-foods, or with albuminoid fluids, some being in good condition and some being athrepsic. The analysis of the gastric juice, which was drawn from the stomach at different periods after the ingestion of food, was made as follows: The juice was filtered, distilled, and deprived of its volatile acids; ether was added, to remove the lactic acid; then it was once more distilled and once more filtered. By Hoffmann's method, the quantity of free hydrochloric acid was determined. The quantitative determination of volatile acids was made twenty-three times in children 9 weeks to 11 months old. In 5 cases the quantities were appre-

ciable, in 7 there were traces, and in 10 there was none at all. The examinations were made three-quarters of an hour to an hour and a quarter after the ingestion of milk. The ages of the 7 children in whom traces of volatile acids were found varied from 9 weeks to 12 months, some being nourished at the breast and others with cows' milk. The juice was examined three-quarters of an hour to two hours after the beginning of digestion. Of the other 10, there were 5 who were nourished at the breast, 2 with diluted cows' milk, 2 with milk-food, and 1 with fluid albuminoids. The juice was examined from five minutes to two hours after eating. In 24 cases the examination for lactic acid was made. In 4 it was wanting, the ages varying from 11 weeks to 8 months, and the children being fed,—1 with Nestlé's food, 1 with fluid albuminoids, and 2 with a decoction of salep.

Traces of it were found in 6, whose ages varied from 11 weeks to 1 year, 3 of them being nourished at the breast, 2 with cows' milk, and 1 with milk-food. In 11 infants from 9 weeks to 11 months old appreciable quantities were found, 4 of the children being nourished at the breast, and the others with cows' milk or milk-food. The quantity of lactic acid did not increase with the duration of the digestion. Free hydrochloric acid was sought in 46 cases and found in 12.

The foregoing facts confirm the statements of Leo, who explains the frequent absence of free hydrochloric acid in the gastric juice of infants by the property which milk possesses of combining with hydrochloric acid, and so failing to appear in fluids that are examined. Hydrochloric acid is found in the free state in children when the *combining* force of the contents of the stomach is rapidly exhausted, as in cases in which children are given a decoction of salep.

GROWTH AND AGE.

BY CHARLES SEDGWICK MINOT, M.D.,
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Charles S. Minot ¹⁷⁸ _{v.12, p.67} has published the results of an extended statistical investigation of the growth of guinea-pigs. The paper is to be followed by others, all bearing upon the general problem: What are the essential phenomena of growing old? or, as it may be termed, of senescence. Senescence is a property of most, perhaps of all, living matter, and so far as known has no parallel in non-living matter.

Minot selected guinea-pigs for his experiments, because, amongst other advantages, they are inexpensive to purchase and keep, bear confinement well, and are but little liable to disease. They were kept during the summer months in spacious pens in the country, and in winter in large boxes, in warm, well-lighted and ventilated rooms. To measure the growth, the weights were taken of the growing and adult individuals, the weight being, in his opinion, the only available measure for the whole animal and the only one permitting comparison between different animals. Each animal was accordingly weighed every day from birth up to the fortieth day, then every fifth day up to two hundred and fifteen days, and after this period every thirtieth day.

In regard to the conditions at birth, it was found that the number of young in each litter varied from one to eight; but litters of one, two, three, and four were by far the most common, and he thinks that two may be regarded as the normal number, which corresponds to the number of teats. The number of young tends to increase with the number of previous pregnancies, and is greater also in warm than in cold weather. In regard to sex, of one thousand guinea-pigs born, four hundred and fifty-six are females and five hundred and forty-four males.

In the spring and summer there is a relatively greater tendency to the production of females. The average weight of a

guinea-pig at birth is about 70 grammes (2½ ounces), and Minot points out the remarkable circumstance that a growing guinea-pig may bear young without impeding its own growth, a fact directly opposed to the theoretical assumptions of Carpenter, Herbert Spencer, and others.

The influence of gestation upon growth involves questions of general interest. It has been usual amongst physiologists to accept the view that the functions of nutrition and reproduction are opposed to each other, because reproduction makes such a demand upon the parent for material; but this proceeds on the assumption that before reproduction the organism must be growing nearly or quite up to the maximum of its assimilative power. Minot's, Edlefsen and Hensen's experiments all show that this is an unwarrantable assumption, and that in point of fact female guinea-pigs grow about the same, whether they have young or not, during their own growing period. Immediately after delivery, however, there is a great and very rapid loss of weight, which continues for several days. The diminution proceeds at a slower rate for about three weeks, after which the recovery of weight begins.

The determination of the period of puberty is not easy to arrive at, but probably occurs about the fourth or fifth month of age. The average duration of gestation is sixty-seven days, but is somewhat less when the litter happens to be large.

From a series of measurements, which embrace a very large number of observations, Minot constructs graphic curves, which show that at birth the male is slightly heavier than the female; but the female immediately makes a marked gain, owing to its having a less post-natal retardation than usual, and it is not until the twenty-ninth day that the male, weighing 203.8 grammes (6 ounces, 4 drachms, 24½ grains), catches up to the female, weighing 203.7 (6 ounces, 4 drachms, 22½ grains). After the first month to the end of the first year the males at every age are, on the average, heavier than the females.

Continuing these observations through the second year, he finds that when the two sexes have attained adult life the female surpasses the male. Minot points out that the curve of growth in guinea-pigs of both sexes differs to a marked extent from the curve of human growth. This curve, as determined by H. P. Bowditch,

always exhibits a great fluctuation associated with puberty, as there is a pre-pubertal acceleration and a post-pubertal retardation, both modifications being most frequent in females. He thinks that the diminution in rate of growth which occurs in guinea-pigs of both sexes, beginning about the end of the fourth month, and which is greater in amount and longer in duration in the female, corresponds to the post-pubertal retardation of the human species; and it would clearly be interesting to determine whether such double pubertal fluctuation of growth occurs in all mammals.

Minot's observations afford extensive materials for the study of individual variations. Each animal appears to strive to reach a particular size; whilst some grow for a time too rapidly, others grow for a time too slowly; but the tables show, and this is supported by Pagliani's observation, that if an individual grows for a period excessively quickly, there immediately follows a period of slower growth, and *vice versa*. Those that remain behind for a time, if they continue in good health, make up the loss soon afterward.

Hence, he has found that to permanently dwarf a guinea-pig requires an astonishingly prolonged interference; a young guinea-pig may lose one-third of its weight from a severe intestinal catarrh, and yet make it up subsequently.

The most important conclusion reached by Minot is the statistical demonstration that there is a steady loss in the power of growth, beginning almost immediately after birth and continuing throughout the growing period. That this fact has not been before recognized is due to the misconceptions which have prevailed as to the significance of the term "rate of increase," owing to the fact that the actual absolute increments of equal successive periods have been taken as the index, whereas, as insisted upon by him, if the absolute increments are constant, the rate of growth must necessarily diminish.

If, for example, an animal adds, say, 10 grammes (2 drachms 34 grains) weekly to its weight, its rate of increase is clearly diminishing; for, were it equal, it would add 10 grammes and the $\frac{1}{10}$ (15½ grains) of 10 grammes in that period, and so on in compound proportion. Minot, to avoid this difficulty, expresses the rate of growth as the percentage of increase daily during a given period above the weight at the beginning of that period.

The following table summarizes the results; the weights are expressed in grammes:—

FEMALES, AVERAGES.					Age in Days.	MALES, AVERAGES.				
Daily per cent. Increase.	Average Daily Increase.	Increase over last Measurement.	Average.	Number of Observations.		B	C	D	E	F
<i>f</i>	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>						
2.1	1.5	4.4	70.1	172	0	200	70.8			
5.5	4.1	12.2	86.7	158	1-3	138	70.8			
5.4	4.7	14.0	100.7	165	4-6	133	82.6	11.8	3.9	5.6
4.7	4.7	14.1	114.8	163	7-9	142	98.2	13.6	4.5	5.5
5.0	5.8	17.8	132.1	158	10-12	148	109.7	13.5	4.5	4.7
4.3	5.7	17.0	148.1	157	13-15	150	126.2	16.5	5.5	5.0
8.6	5.2	15.6	164.7	149	16-18	152	141.7	15.5	5.2	4.1
1.7	4.7	14.0	178.7	158	19-21	151	158.4	16.7	5.6	3.9
1.9	3.4	10.3	189.0	154	22-24	152	173.2	14.8	4.9	3.1
2.6	4.9	14.7	203.7	153	25-27	145	187.8	14.6	4.9	2.8
1.8	3.7	11.1	214.8	136	28-30	141	208.8	16.0	5.3	2.8
1.8	3.5	10.5	225.3	139	31-33	140	215.6	11.8	3.9	1.9
1.8	4.1	12.2	237.5	138	34-36	138	226.9	11.3	3.8	1.7
1.1	2.5	28.0	286.1	150	37-39	129	240.2	13.3	4.4	1.9
1.3	8.3	50.6	316.7	144	40-50	149	272.9	32.7	3.0	1.2
0.8	2.6	39.2	355.9	131	55-65	156	327.1	54.2	3.6	1.3
0.9	8.4	51.2	407.1	120	70-80	155	383.9	56.8	3.8	1.2
0.8	8.1	48.4	453.5	88	85-95	152	434.4	50.5	3.4	0.9
0.5	2.3	34.8	488.3	58	100-110	102	481.6	47.2	3.1	0.7
0.2	0.9	14.5	502.8	70	115-125	75	522.8	41.2	2.7	0.6
-0.03	-0.2	-2.6	500.2	73	145-155	57	529.8	7.0	0.5	0.1
0.5	2.7	39.9	540.1	67	160-170	73	562.9	33.1	2.2	0.4
0.2	1.0	14.3	554.1	66	175-185	75	560.5	227.6	1.8	0.3
0.2	1.2	18.7	573.1	66	190-200	76	604.7	14.2	0.9	0.2
0.3	1.5	22.7	585.8	68	205-215	70	627.0	22.3	1.5	0.2
						61	668.3	36.3	2.4	0.4
Months.										
0.2	1.8	88.7	634.5	74	8-5 to 8+5	56	672.0	8.7	0.3	0.05
0.2	1.1	32.1	666.6	52	9-5 to 9+5	53	737.7	65.7	2.2	0.3
0.1	1.0	30.5	687.1	66	10-5 to 10+5	58	761.6	23.9	0.8	0.1
0.1	0.8	24.6	721.7	76	11-5 to 11+5	68	770.3	8.7	0.3	0.04
0.05	0.3	10.5	732.2	64	12-5 to 12+5	68	793.9	23.6	0.8	0.1
0.3	2.4	73.3	805.5	46	13-5 to 13+5	68	754.9	39.0	-1.3	-0.2
-0.03	-0.3	-7.9	797.6	32	14-5 to 14+5	72	744.1	-10.8	-0.8	-0.05
0.00	0.05	1.8	799.2	46	15-5 to 15+5	68	730.2	45.1	1.5	0.2
0.2	1.8	53.0	852.2	30	16-5 to 16+5	58	805.9	16.7	0.5	0.07
-0.02	-0.2	-6.6	845.6	38	17-5 to 17+5	82	781.4	-24.5	-0.8	-0.1
-0.2	-1.4	-41.7	803.9	20	18-5 to 18+5	89	770.1	-11.3	-0.4	-0.05
-0.1	-0.9	-80.4	723.5	22	19-21	101	766.5	-3.6	-0.04	-0.006
-0.05	-0.3	-31.1	692.4	16	22-24	97	782.6	16.1	0.2	-0.02

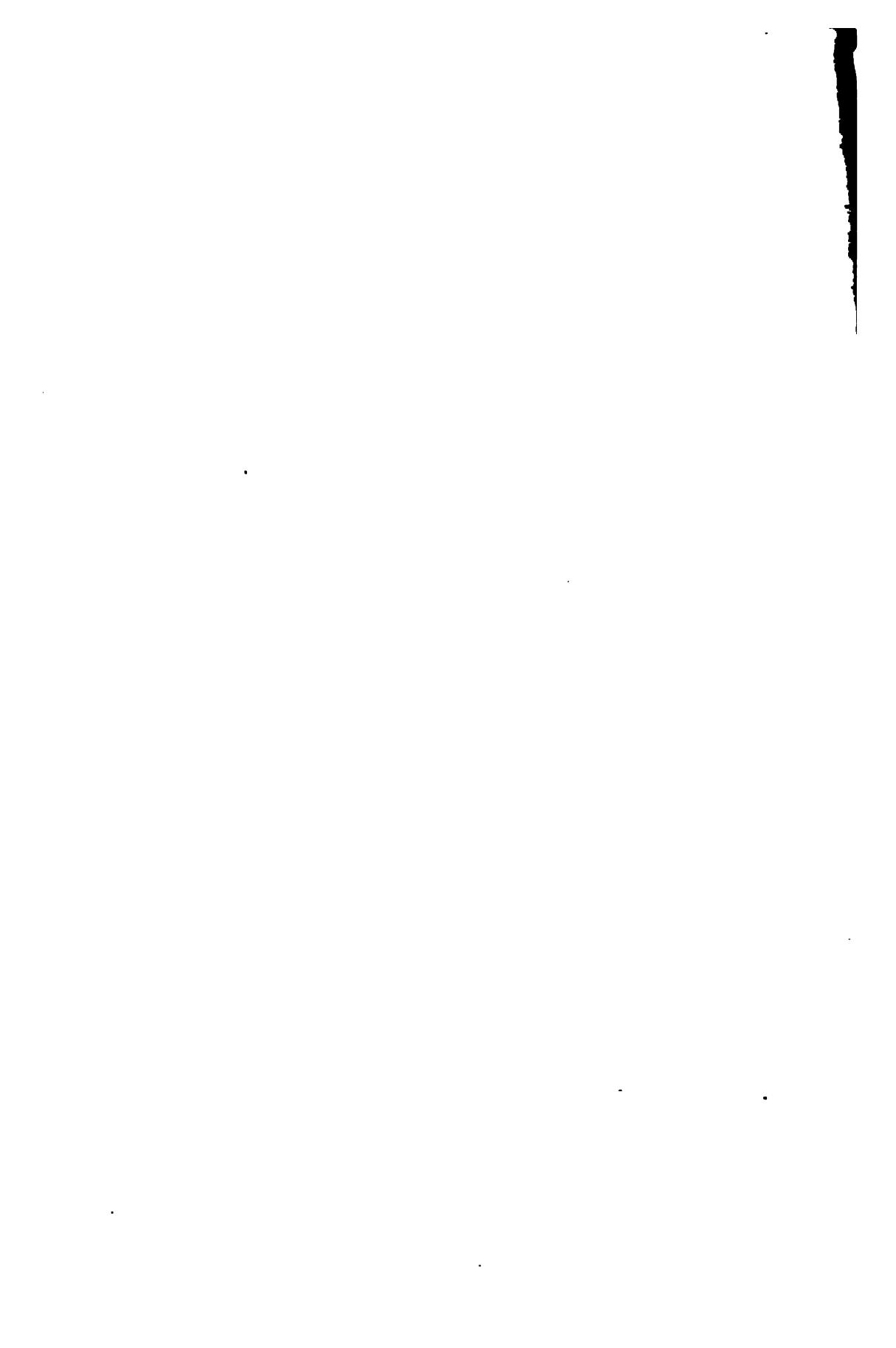
By consulting the columns *f* and *F*, it will be seen at once that the rate of growth diminishes with inconsiderable fluctuations. We are accordingly forced to give up the long-prevalent notion that there is in life a period of development and a period of decline; on the contrary, it is probable that the decline begins before birth.

A remarkable instance of excessive growth has been recorded, which may be considered more than a mere curiosity, as it indicates that giants result from long-continued growth. At a meet-

ing of the Kiev Medical Society, Alexei N. Kolomietz ⁵⁸⁶ _{March 26, 1881} showed a South-Russian giant girl, named Elizaveta Lyska. She is at present aged 13 years and 4 months. Her height is 2.03 metres; the circumference of the chest at the axillary level measures 102 centimetres, and at the level of the nipples 101; that of the waist, 100; that of the thigh, 65. The dimensions of individual limbs are perfectly proportionate to her height, but the size of her skull (which corresponds to that of an adult woman) is relatively small. She weighs about 280 pounds avoirdupois. The average daily quantity of urine amounts to 2500 cubic centimetres; its specific gravity, 1012; the proportion of urea, 2 per cent.; that of chlorides, 1.7. The girl has not yet menstruated. The quantity of food (mostly vegetables and sour milk) consumed by her is rather less than in the case of an average healthy adult man, while she ingests twice as much fluids. The girl's parents are of a middle size, and generally do not present any particular features. They have seven children, the giant being the fourth. According to the parents' statements, the girl began rapidly to grow since about 4 years of age, at 5 years of age attaining 1.19 metres in height and 108.3 pounds in weight. At 10 years old she was 1.86 metres high and weighed 234.6 pounds. She still continues to grow fairly quickly. Since her examination by Virchow, twenty-one months ago, her height has increased 0.1 metre, and the circumference of the chest 0.03, and of the waist 0.04.

The ages of numerous actors are recorded,⁷⁹ and show that in that profession considerable longevity is usual.

Sir James Crichton-Brown's address² upon "Old Age" is full of original suggestions, derived from a long experience, but does not have the form of a scientific research. His most important point is, that though the average duration of life has steadily increased in England during the century, yet the average life of persons attaining old age has been shortened. This regrettable change he attributes to the increased wear and tear of life, and the consequent premature degeneration and atrophy of the tissues and organs, of which he gives many illustrations.



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By N. I. McCARTHY,

PHILADELPHIA.

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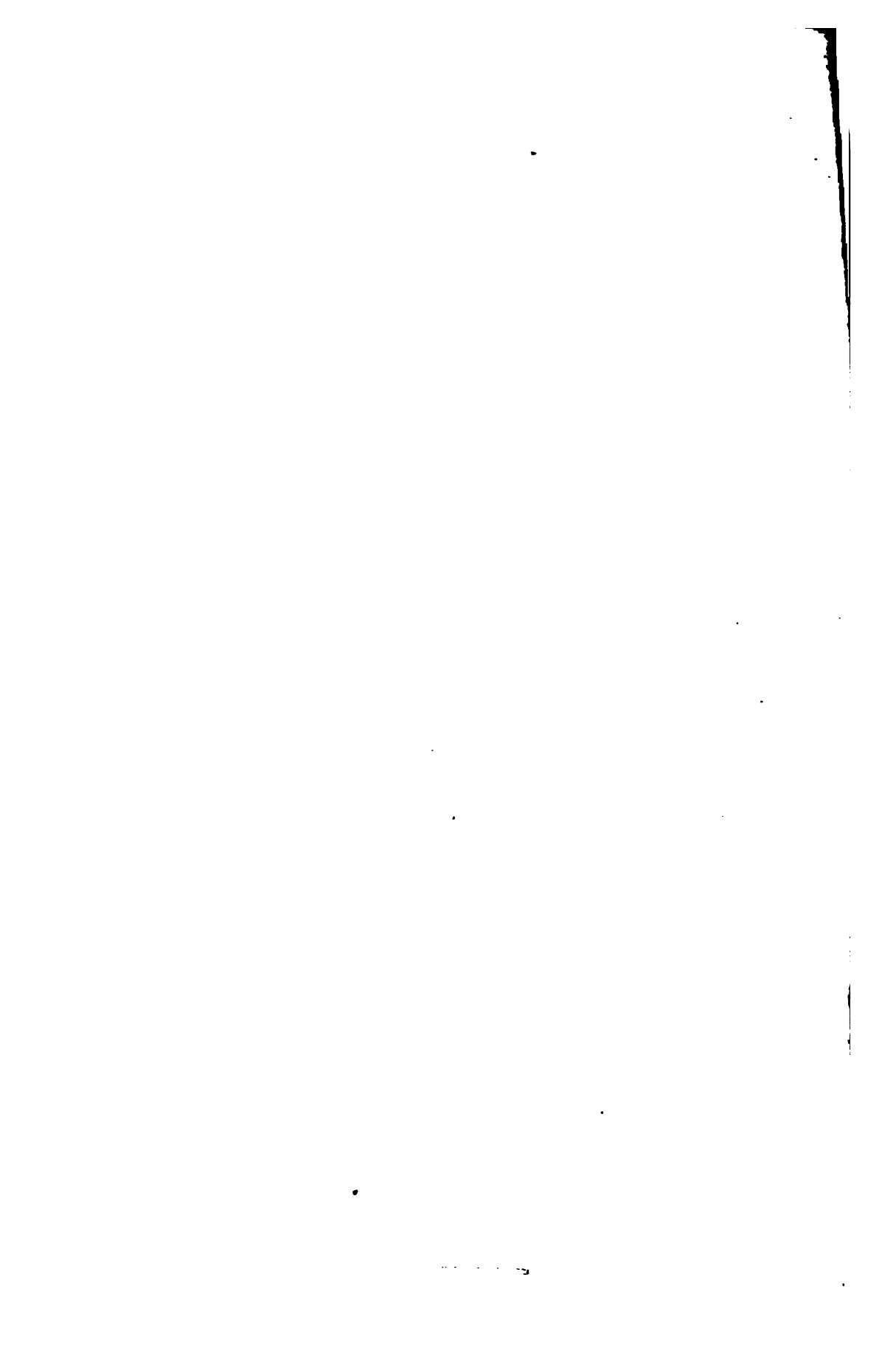
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 356. *Archives de biologie*, Gand.
 357. *Zeitschrift für Therapie*, Vienna.
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523. *Kinesithérapie*, Paris.

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